



This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

- + *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.
- + *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.
- + *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.
- + *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at <http://books.google.com/>

**GRADUATE SCHOOL
OF BUSINESS
ADMINISTRATION
HARVARD BUSINESS
LIBRARY
GEORGE F. BAKER FOUNDATION**



**GIFT OF
New York State Library**

C 5:22-
5

THIRTY-THIRD YEAR

THE

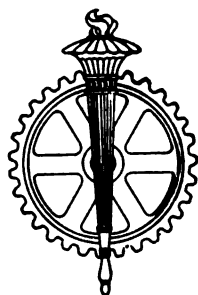
ENGINEERING INDEX

ANNUAL

FOR

1916

COMPILED FROM THE ENGINEERING INDEX PUBLISHED MONTHLY
IN THE ENGINEERING MAGAZINE DURING 1916.



NEW YORK
THE ENGINEERING MAGAZINE CO.
1916



Nov. 16. 1926

QK.1
E58
1916

COPYRIGHT, 1916,
BY
THE ENGINEERING MAGAZINE CO.

W. H. Stone & Co.
9

Drawn from
H. A. State Library

TO THE USER

WITH this volume of THE ENGINEERING INDEX—the fifteenth since the work was first undertaken and the eleventh since it assumed the “Annual” form—a continuous index to the engineering and technical literature of the past thirty-three years is made available to the reader. And in this book, as in the Annual volumes previously issued, the “classified” system of arranging the items is followed in place of the “strict alphabetic” order of the earlier volumes. In other words, the articles indexed are first grouped under the great divisions of engineering practice to which they belong—Civil, Mechanical, Electrical, Mining, etc.—and under these again they are sub-grouped according to the recognized special divisions of each field. After these two steps have been taken in sorting the miscellaneous literature of the day into closely related sections, the final arrangement under each section becomes strictly alphabetical.

In THE ENGINEERING INDEX ANNUAL for 1916, herewith presented, the Classification of the Index on page 7 not only gives the main and sub-heads of the classified arrangement, but lists in addition every catchword, with its page reference, so that a full outline of the entire contents is given in a highly condensed form, and by running his eyes over this topical list the reader may save much of the time that might be spent searching the pages of the book itself.

Serial articles are indexed upon the appearance of the first installment only, thus giving the searcher the clue by which the succeeding articles can be found. This rule has been waived in some instances of articles in two or three installments, which are indexed entire.

The INDEX comprises about two hundred and fifty publications, representing seventeen nations and colonies and six languages. About three-fourths of these journals are printed in English, the others being in German, French, Spanish, Italian and Dutch. With every entry a brief descriptive note is given defining the scope and purport of the articles, in many cases sufficient for the purpose of the investigator and saving him the labor of further search. In general, however, the INDEX is used as a guide to the otherwise overwhelming mass of information contained in the huge files of the engineering periodicals stacked on the shelves of reference libraries throughout the world.

The work as a whole represents the continuation of that originally started by the late Professor J. B. Johnson in the journal of the Association of Engineering Societies in 1884, and turned over by that association to THE ENGINEERING MAGAZINE at the close of 1895. The successive volumes, published in 1892, 1896, 1901, 1906, 1907, 1908, 1909, 1910, 1911, 1912, 1913, 1914, 1915 and 1916, respectively, covered with increasing fulness and thoroughness the field of periodical literature in engineering and closely related applied sciences. This latest volume brings the investigator down to the December, 1916, monthly part of THE ENGINEERING INDEX, covering the serial literature of engineering up to October, 1916, while the earlier parts enable searches such as occur in patent cases and the like to be prosecuted with a minimum of cost and delay.

REFERENCE LIST OF PERIODICALS

Alphabetical List of Periodicals Indexed in Order of Their Abbreviations

ABBREVIATION	TITLE	ISSUES PER YEAR	PLACE OF PUBLICATION
A A	Aerial Age Weekly	52	New York
A & B	Architecture & Building	12	New York
A A P C M	Assn. Amer. Portland Cement Mfrs.	Irreg.	Philadelphia
A cr	Autocar	52	London
Ae	Aera	12	New York
A E I S	American Electrochemical Society	Irreg.	So. Bethlehem
A E R	American Economic Review	12	Princeton
Aern	Aeronautics	52	London
A E S	Assn. Engineering Societies	12	St. Louis
A F A	Amer. Foundrymen's Assn.	Irreg.	Cleveland
A I & S I	Amer. Iron & Steel Institute	12	New York
A I C E	Amer. Institute of Chemical Engineers	Irreg.	New York
A I E E	Amer. Institute of Elec. Engineers	12	New York
A I M E	Amer. Institute of Mining Engineers	12	New York
A I Mt	Amer. Institute of Metals	Irreg.	Buffalo
A I S E E	Assn. Iron & Steel Elec. Engrs.	1	Pittsburgh
A J I P H	Amer. Journal of Public Health	12	Boston
A J I S	Amer. Journal of Science	12	New Haven
A M S	Australian Mining Standard	52	Sydney
A R	Architectural Record	12	New York
A R B A	Amer. Road Builders' Assn.	Irreg.	New York
A R B & B A	Amer. Ry. Bridge & Bldg. Assn.	Irreg.	Chicago
A R E A	Amer. Ry. Engineering Assn.	10	Chicago
A R M M A	Amer. Ry. Mas. Mech. Assn	1	Chicago
A S	Applied Science	12	Toronto
A S C E	Amer. Soc. of Civil Engineers	10	New York
A S H V E	Amer. Soc. of Heat. & Vent. Engineers	4	New York
A S M D	Amer. Soc. of Marine Draftsmen	4	Washington
A S M E	Amer. Soc. of Mechanical Engineers	12	New York
A S N E	Amer. Soc. of Naval Engineers	4	Washington
A S R E	Amer. Soc. of Refrig. Engrs.	6	New York
A S T M	Amer. Soc. Testing Materials	1	Philadelphia
A T C A O	Assn. of Trans. & Car Acct. Officers	2	New York
Aut	Automobile	52	New York
A W P A	Amer. Wood Preserv. Assn.	Irreg.	Baltimore
A W W A	Amer. Water Works Assn.	4	Baltimore
B C Bul	Barge Canal Bulletin	12	Albany
B C B M	British Columbia Bureau Mines	Irreg.	Victoria
B E C	Brooklyn Engineers' Club	1	Brooklyn
B F & S P	Blast Furnace & Steel Plant	12	Pittsburgh
Bkbl	Brickbuilder	12	Boston
B M	Boiler Maker	52	New York
B P	Boletin de Petroleo	12	Mexico
B R & S	Better Roads & Streets	12	Jamestown, O.
B S C E	Boston Soc. of Civil Engineers	10	Boston
B W	Brass World & Platers' Guide	12	New York
C A M	Compressed Air Magazine	12	New York
C C E	Cornell Civil Engineer	8	Ithaca
C D M	Canada Department of Mines	Irreg.	Ottawa
C E M	Cassier's Engineering Monthly	12	London
C E S St P	Civil Engineers' Soc., St. Paul	1	St. Paul
C G	Colliery Guardian	52	London
C I A At	Atti. Colleg. Ingegneri ed Arch.	12	Milan
Cl A	Coal Age	52	New York
C M I	Canadian Mining Institute	12	Montreal
C M J I	Canadian Mining Journal	24	Toronto
C M M S S A	Chem. Met. & Min. Soc. of South Africa	12	Johannesburg

ABBREVIATION	TITLE	ISSUES PER YEAR	PLACE OF PUBLICATION
C M W A	Chamber of Mines of West Australia	12	Kalgoorie
Cn E	Canadian Engineer	52	Toronto
Cnr	Contractor	24	Chicago
Cnt	Contracting	12	New York
C R C	Central Railway Club	6	New York
Crt	Concrete	12	Detroit
C S C E	Canadian Soc. of Civil Engineers	Irreg.	Montreal
C S M M	Colorado School of Mines Magazine	12	Golden
C U Q	Columbia University Quarterly	4	New York
C V	Commercial Vehicle	24	New York
Cw E	Commonwealth Engineer	12	Melbourne
D W P B	Dominion Water Power Branch, Dept. Int.	Irreg.	Ottawa
E & C	Engineering & Contracting	52	Chicago
E & M J	Engineering & Mining Journal	52	New York
E C D	Engineers' Club of Dayton	Irreg.	Dayton
E C P	Engineers' Club of Philadelphia	4	Philadelphia
E C St L	Engineers' Club of St. Louis	6	St. Louis
E G	Economic Geology	8	New Haven
El A	Electrical Age	12	New York
El JI	Electric Journal	12	Pittsburgh
Eln	Electrician	52	London
El R	Electrical Review	52	London
El R & W E	Electrical Review & West. Electrician	52	Chicago
El R JI	Electric Railway Journal	52	New York
El T	Electric Traction	12	Chicago
El W	Electrical World	52	New York
E M	The Engineering Magazine	12	New York
E N	Engineering News	52	New York
Eng	Engineering	52	London
Enr	Engineer	52	London
E R	Engineering Record	52	New York
E S P	Engineers' Soc. of Pennsylvania	12	Harrisburg
E S W P	Engineers' Soc. of West. Pennsylvania	10	Pittsburgh
F I	Franklin Institute	12	Philadelphia
Fly	Flying	12	New York
Fnd	Foundry	12	Cleveland
G A	Gas Age	24	New York
G E R	General Electric Review	12	Schenectady
Gn Cv	Génie Civil	52	Paris
G R	Good Roads	12	New York
G W	Gas World	52	London
H A	Horseless Age	24	New York
H & V M	Heating & Ventilating Magazine	12	New York
I A	Iron Age	52	New York
I & C T R	Iron & Coal Trades Review	52	London
I & R	Ice & Refrigeration	12	Chicago
I C E I	Institution Civil. Engineers of Ireland	1	Dublin
I C E	Institution of Civil Engineers	Irreg.	London
I E	Industrial Engineering	12	New York
I E E	Institution of Electrical Engineers	Irreg.	London
I E S S	Instn. Engrs. & Shpbldrs. of Scotland	Irreg.	Glasgow
I F	L'Ingegneria Ferroviaria	24	Rome
I I Bul	Bulletin of the Imperial Institute	4	London
I Mch E	Institution of Mechanical Engineers	Irreg.	London
I M E	Institution of Mining Engineers	Irreg.	London
I M M	Institution of Mining & Metallurgy	Irreg.	London
I Mr E	International Marine Engineering	12	New York
Ind	L'Industria	52	Milan
Ing	Ingenieur	52	The Hague
I S C A M A	Iowa State Col. & Agri. & Mech. Arts	4	Ames
I S E	Institute of Sanitary Engineers	12	London
I T R	Iron Trade Review	52	Cleveland
Jl Act	Journal of Accountancy	12	New York

REFERENCE LIST OF PERIODICALS

ABBREVIATION	TITLE	ISSUES PER YEAR	PLACE OF PUBLICATION
Jl G	Journal of Geology	8	Chicago
K A E	Keighly Assn. of Engineers	Irreg.	Keighly
La Nt	La Nature	52	Paris
L S M I	Lake Superior Mining Institute	1	Superior
M A E	Manchester Assn. of Engineers	Irreg.	Manchester
M & C E	Metallurgical & Chemical Engineering	24	New York
M & E R	Mining & Engineering Review	12	Melbourne
M & E W	Mining & Engineering World	52	Chicago
M & S P	Mining & Scientific Press	52	San Francisco
M B M A	Master Boiler Makers' Assn.	1	New York
Mch	Machinery	12	New York
Mch E	Mechanical Engineer	52	Manchester
Mch W	Mechanical World	52	Manchester
M E & N A	Marine Engineer & Naval Architect	12	London
M I	Metal Industry	12	New York
M JI	Mining Journal	52	London
M Mg	Mining Magazine	12	London
M M S A	Mining & Metallurgical Soc. of Amer.	12	New York
M Rd	Manufacturers' Record	52	Baltimore
M Rv	Marine Review	12	Cleveland
M T	Monitore Tecnico	36	Milan
Mun E	Municipal Engineering	12	Indianapolis
Mun JI	Municipal Journal	52	New York
N E	National Engineer	12	Chicago
N E C I E S	N-E Coast Instn. Engrs. & Shpbltrs.	Irreg.	New Castle
N E W W A	New England Water Works Assn.	4	Boston
N F A Sf Bul	National Founders' Assn. Saf. Bulletin	12	West Lynn
N G M	National Geographic Magazine	12	Washington
N L M A	National Lime Manufacturers' Assn.		
Nt	Nature	52	London
N Y R C	New York Railroad Club	9	New York
O S M E S E	Ohio Soc. Mech., Elec. & Steam Engrs.	2	Columbus
P B S	Philippine Bureau of Science	Irreg.	Manila
P C An	Annales des Ponts et Chaussées	6	Paris
P E, C	Practical Engineer, Chicago	24	Chicago
P JI S	Philippine Journal of Science	6	Manila
P W I	Permanent-Way Institution	4	Beeston
Pwr	Power	52	New York
Q G M JI	Queensland Government Mining Journal	12	Brisbane
Qry	Quarry	12	London
R A G	Railway Age Gazette	52	New York
R & L E	Railway & Locomotive Engineering	12	New York
R C P	Railway Club of Pittsburgh	9	Pittsburgh
R E	Railway Engineer	12	London
R E & M W	Railway Engineering & Maint. of Way	12	Chicago
R G	Railway Gazette	52	London
R G S	Revue generale des Sciences	24	Paris
R M	Rivista Marittima	12	Rome
R M E	Railway Mechanical Engineer	12	New York
R M M	Railway Master Mechanic	12	New York
R R	Railway Review	52	Chicago
R S A	Royal Society of Arts	52	London
R S E	Railway Signal Engineer	12	Chicago
R T	Resources of Tennessee	4	Nashville
R T C	Revue Trimestrielle Canadienne	4	Montreal
R U S I	Royal United Service Institution	4	London
S A E	Society of Automobile Engineers	12	New York
S & I	Steel and Iron	12	Pittsburgh
S & S-W R C	Southern & Southwestern Railway Club	6	Atlanta
S B	Schweizerische Bauzeitung	52	Zurich
S C A An	Anales de la Soc. Cientif. Argentina	6	Buenos Aires
S C I Rv	Revista, Soc. Cubana de Ingenieros	12	Havana
S E	Society of Engineers	12	London

REFERENCE LIST OF PERIODICALS

5

ABBREVIATION	TITLE	ISSUES PER YEAR	PLACE OF PUBLICATION
S E I N	Societe d'Encourag., Indus. Nation.	12	Paris
Sf E	Safety Engineering	12	New York
S I	Stevens Indicator	4	Hoboken
S I A I An	Annali, Soc., Ingeg. e Archit. Ital.	24	Rome
S I C F	Societe Ingenieurs Civils de France	Irreg.	Paris
S I E	Societe Internation. Electriciens	Irreg.	Paris
S J I E	Sibley Journal of Engineering	9	Ithaca
S L R C	St. Louis Railway Club	12	St. Louis
S M	Scientific Monthly	12	New York
S M C E	Surveyor & Municip. & County Engr.	52	London
S M Q	School of Mines Quarterly	4	New York
S N A M E	Soc. Naval Arch. & Mar. Engineers	Irreg.	New York
S P S M	Soc. to Promote Sci. of Management	6	Hanover
S R & M E	Sanitary Rec. & Municip. Engineer	52	London
T & R W	Tramway & Railway World	12	London
T E	Telephone Engineer	12	Chicago
T E A	Traveling Engineers' Assn.	Irreg.	East Buffalo
Tly	Telephony	52	Chicago
T S	Travelers Standard	12	Hartford
U E E S	Utah Engineering Experiment Station	Irreg.	Salt Lake City
U I	University of Illinois	Irreg.	Urbana
U M	University of Minnesota	Irreg.	Minneapolis
U M S M M	Univ. of Mo. School of Min. & Metall.	4	Rolla
U N P	Universidad Nacional de la Plata	Irreg.	La Plata
U S B M	U. S. Bureau of Mines	Irreg.	Washington
U S B S	U. S. Bureau of Standards	Irreg.	Washington
U S C & G S	U. S. Coast & Geodetic Survey	Irreg.	Washington
U S D A	U. S. Dept. of Agriculture	Irreg.	Washington
U S G S	U. S. Geological Survey	Irreg.	Washington
U S N I	U. S. Naval Institute	6	Annapolis
W E	Western Engineering	12	San Francisco
W G N H S	Wis. Geol. & Nat. Hist. Surv.	Irreg.	Madison
Wis E	Wisconsin Engineer	9	Madison
W P I J I	Jour. Worcester Polytech. Institute	6	Worcester
W R C	Western Railway Club	9	Chicago
W S E	Western Soc. of Engineers	10	Chicago

ORIGINAL ARTICLES SUPPLIED

We hold ourselves ready to supply—if not out of print—the full text of every article indexed in this volume, *in the original language*, together with all accompanying illustrations; and our charge in each case is regulated by the cost of a single copy of the journal in which the article is published. The price of each article is indicated by the letter following the number. When no letter appears, the price of the article is 20 cents. The letter A denotes a price of 40 cents; B, of 60 cents; C, of 80 cents; D, of \$1.00; E, of \$1.20; F, of \$1.60. When the letter N is used it indicates that copies are not readily obtainable, and that particulars as to price will be supplied on application. Certain journals, however, make large extra charges for back numbers. In such cases we may have to increase proportionately the normal charge given in the INDEX. In ordering, care should be taken to *give the number* of the article desired, not the title alone.

To avoid the inconvenience of letter-writing and small remittances, especially from foreign countries, and to cheapen the cost of articles to those who order frequently, we sell coupons at the following prices:—20 cents each, or book of twelve for \$2.00, three books for \$5.00.

Each coupon will be received by us in payment for any 20-cent article catalogued in the INDEX. For articles of a higher price, one of these coupons will be received for each 20 cents; thus, a 40-cent article will require two coupons; a 60-cent article, three coupons, and so on. The use of these coupons is strongly commended to those who use the INDEX regularly. They not only reduce the cost of articles 25 per cent (from 20 cents to 15 cents), but they need only a trial to demonstrate their very great convenience—especially to engineers in foreign countries, or away from libraries and technical club facilities.

Write for a sample coupon—free to any part of the world.

CLASSIFICATION OF THE INDEX

TO THE USER: This classification should always be consulted, and the page number of the proper division ascertained, before looking for an item in the body of the book.

CIVIL ENGINEERING

BRIDGES

Approaches	25	Drawbridge	29	Masonry	29	Review of 1915	31
Arch	25	Mechanism	27	Manhattan	29	San Francisco	31
Australia	25	Drawbridges	27	Memphis	29	Specifications	31
Baltimore	25	Elevated Rail-	27	Military	29	Steel	31
Bascule	25	road	27	Ohio River	29	Steel and con-	31
Bridgeport, Conn.	25	Erection	28	Ottawa	29	crete	31
Building Code	26	Falsework	28	Overflow Bridges	29	Steel Arch	31
Caissons	26	Floors	28	Piers	29	Stone	31
Cantilever	26	Foundations	28	Plate Girders	29	Stresses	31
Causeway	26	Girder	28	Ponton	29	Substructures	31
Centering	26	Hell Gate	28	Pontoon	29	Suspension	31
Charing Cross	26	Highway	28	Portland, Me.	29	Susquehanna	32
Chicago	26	Impact	28	Progress	29	Swing	32
Cleveland	26	Iron Deprecia-	28	Quebec	30	Three-Hinge	32
Collapse	26	tion	28	Railroad Bridges	30	Trestles	32
Concrete	26	K-Truss	28	Raising	31	Viaducts	32
Construction	27	Lawrence, Mass.	28	Reconstruction	31	Vibrations	33
Culverts	27	Lift	28	Reinforced Con-	31	Wind Damage	33
Design	27	Maintenance	29	crete	31		

CONSTRUCTION

Acoustics	33	Chimneys	34	Construction	36	Electrolysis	37
Aesthetics	33	Coal Dock	34	Camps	36	Equitable Build-	37
Aggregate	33	Coaling Plant	34	Construction	36	ing	37
Washing	33	Cofferdams	34	Lighting	36	Sssex Plant	37
Australia	33	Coliseum Roof	34	Dam Failure	36	Excavation	37
Backfilling	33	Concrete	34	Dams	36	Excavators	37
Banded Columns	33	Conduits	35	Derricks	37	Factories	38
Bank Vaults	33	Contract Work	36	Diary	37	Fences	38
Bins	33	Concrete	36	Difficult Opera-	37	Fire Protection	38
Blasting	34	Concrete Handl-	36	tions	37	Floors	38
Building Code	34	ing	36	Docks	37	Fortification	38
Building Details	34	Concrete	36	Dome	37	Foundations	38
Building Failure	34	Corrosion	36	Drills	37	Framing	39
Buildings Laws	34	Contract Forms	36	Dump-Cars	37	Gas Tanks	39
Buildings	34	Contractors'	36	Earthquakes	37	Grain Elevators	39
Caissons	34	Bonds	36				

CONSTRUCTION—(Continued)

Grouting	39	Pile-driver	40	Reservoirs	41	Standardized	
Grubbing	40	Piles	40	Retaining Walls	41	Buildings	42
Hangars	40	Pipe Lines	40	Riveting	41	Steelwork	42
Riveting	41	Pipes	40	Roof Drainage	41	Subways	42
I-Beams	40	Plastering	40	Roof Failure	41	Swimming Pools	42
Industrial Build- ings	40	Pole Holes	40	Roofs	41	Tanks	42
Levees	40	Power Plants	41	Roof Supports	41	Terminals	42
Lighthouse	40	Power Station	41	Roof Trusses	41	Trenching Ma- chinery	43
Lowering Devices	40	Public Baths	41	Sand Storage	41	Tunnels	43
Moving	40	Quay Walls	41	Sewers	41	Underpinning	44
Moving Plant	40	Radio Towners	41	Slabs	41	Vibration	44
National Parks	40	Railways	41	Slides	42	Walkways	44
Oil Tank	40	Reconstruction	41	Sound	42	Warehouses	44
Patented P r o- cesses	40	Refuse Incinera- tor	41	Specifications	42	Wastes	44
Piers	40	Reinforced Con- crete	41	Stacks	42	Water Tanks	44
				Stadium	42	Waterproofing	44
				Stairways	42	Wrecking	44

IRRIGATION AND RECLAMATION

Arrowrock Dam	45	Drainage	45	Irrigation Works	46	Rights-of-Way	47
Big Horn Canyon	45	Drains	46	Los Angeles	46	Run-Off	47
Canada	45	Elephant Butte	46	Louisiana	46	Structures	47
Canals	45	Excavating	46	Metering	46	Sudan	47
Classification	45	Flood Control	46	Montana	46	Tile Drainage	47
Dams	45	Flow	46	Nile	46	Trenching Ma- chinery	47
Dikes	45	Holland	46	North Carolina	46	Waste Lands	47
Distribution	45	Idaho	46	Power Develop- ment	46	Water Duty	47
Ditch Excavation	45	Irrigation	46	Pumping	46	Wells	47
Ditching	45	I r r i g a t i o n Systems	46	Relief Gates	47		

MATERIALS OF CONSTRUCTION

Aggregates	47	Floors	50	Paving Brick	51	Tar Products	52
Asphalt	48	Forest Products	50	Piles	52	Tars	52
Asphalt Shingles	48	Framing	50	Pipe Joints	52	Tile	52
Balsa Wood	48	Grading	50	R a i l r o a d Materials	52	Timber	52
Brick	48	Gravel	50	Raw Materials	52	Timber Preser- vation	53
Cement	48	Hydrated Lime	51	Red Lead	52	Timber Treat- ment	53
Coal-Gas Resid- uals	48	Internal Stress	51	Reinforcement	52	Varnish	53
Concrete	48	Iron Protection	51	Road-Build i n g Rock	52	Wastes	53
Copper-Steel	49	Iron Scale	51	Road Materials	52	Wireglass	53
Corrosion	49	Laboratory	51	Rubber	52	Wire Rope	53
Creosoting	50	Lime	51	Sewer Pipe	52	Wood	53
Drain Tile	50	Lumber	51	Slags	52	Wood Block	54
Explosives	50	Oils	51	Stone	52	Wood Pipe	54
Fire Brick	50	Oxy-Acetylene	51	Straining Effects	52	Wood Waste	54
Fire Clays	50	Paints	51	Stucco	52		
Fire Resisting	50	P a t e n t e d Materials	51				

MEASUREMENT

Arches	54	Columns	55	Eccentric Load- ing	56	Formula	57
Barometers	54	Column Tests	55	Elasticity	56	Frames	57
Beams	54	Concrete	55	English Measures	56	Gas Flow	57
Brick Testing	55	Cross - Sectioning	56	Estimates	56	Gas Testing	57
Bridge Stresses	55	Cubic Perform- ance	56	Evaporation	56	Girder Design	57
Bridge Trusses	55	Curves	56	Excavation	57	H a r m o n i c Analyzer	57
Bucket Pins	55	Drainage	56	Filing-System	57	Hydraulic Jump	57
Catenary	55	Drain Tile	56	Floors	57	Hydrography	58
Cement Testing	55	Earth Pressures	56	Flow	57	Illinois	58
Charts	55						

MEASUREMENT—(Continued)

Impact	58	Metric System ..	58	Rivets	59	Structures	60
Indetermin a t e		New Mexico	58	Safety Factors ..	59	Surveying	60
Stresses	58	Oil	58	Sea Level	59	Tensile Tests ...	61
Internal Stress ..	58	Oil Flow	58	S e c o n d a r y		Tests	61
Lattice Bars	58	Piling	58	Stresses	59	Thermoelements..	62
Latticed M e m -		Pipe Discharge ..	59	Slabs	59	Topography	62
bers	58	Pipe Tests	59	Soil Pressures ..	60	Triangulation ..	62
Leveling	58	Plane Co-ordin-		Spirit Leveling ..	60	Trusses	62
Logarithms	58	ates	59	Splices	60	Venturi Meters ..	62
Loss of Head	58	Plasticity	59	Stays	60	Water Flow	62
Magnetic Varia-		Rainfall	59	Straining Effects	60	Weir Formulas ..	62
tions	58	Recorder Shelter	59	Stream Measure-		Weir Meter	62
Mass Diagram ..	58	Reservoirs	59	ment	60	Weirs	62
Meters	58	Retaining Walls ..	59	Structural Steel ..	60	Wind Pressure ..	62
Meter Tests	58	Riveted Joints ..	59			Wood Tests	63

MUNICIPAL

Activated Sludge	63	Drainage	65	P h i l a d e l p h i a		Snow Removal ..	70
Atmospheric Pol-		Economy	65	Works	66	Statistics	70
lution	64	Filing	65	Public Utilities ..	66	Storm Water ...	71
Bathing Beach ..	64	Fire Alarms	65	Refuse	66	Street Cleaning ..	71
Baths	64	Fire Apparatus ..	65	Refuse Destruction		Street Lighting ..	71
Bituminous	64	Fire Protection ..	65	tion	66	Street Opening ..	71
Brick	64	Garbage Disposal	65	Refuse Disposal ..	66	Streets	71
Building Code ..	64	Havana	65	Refuse Incinera-		Street Watering..	71
City Administra-		Harbor Pollution	65	tor	66	Street Widths ...	71
tion	64	Imhoff Tanks	65	St. Louis	66	Swimming Pools..	71
City Managers ..	64	Indianapolis	66	Sanitation	67	Town Planning ..	71
City Planning ..	64	Lille	66	Sewage Disposal ..	67	Traffic	71
Cooperation	65	Mapping	66	S e w a g e Treat-		Traffic Control ..	71
Cubic Perform-		Model Towns	66	ment	69	Utility Lines ...	71
ance	65	Mosquitoes	66	Sewerage	69	Wastes	71
Culverts	65	Municipalities ..	66	Sewer Pipe	69	W a t e r De-	
Concrete	65	Municipal Plant ..	66	Sewers	69	partment	72
Concrete Struc-		Municipal Work ..	66	Sheringham	70	Wath - u p o n -	
tures	65	Nitrogen	66	Smoke	70	Dearne	72
		Power Plant	66				

ROADS AND PAVEMENTS

Africa	72	Forest Roads ...	76	Los A n g e l e s		Quebec	80
Asphalt	72	Foundations ...	76	County	78	Repairs	80
Asphalt Block ...	72	Glutrin	76	Macadam	78	Repaving	80
Asphalt Plant ..	72	Grading	76	Maintenance ...	78	Resurfacing	80
Bituminous	73	Granite	77	Material Hauling	79	Road Contracts ..	80
Bituminous Mate-		Nova Scotia ...	79	Mixing Plant ...	79	Road Materials ..	80
rials	73	Gravel	77	National Parks ..	79	Road Signs	81
Block	73	Haulage Costs ..	77	New York	79	Road Space	81
Brick	73	Highway Admin-		San Francisco ..	81	Road Traffic ...	81
Caliche	74	istration	77	Oiling	79	Road Work	81
California	74	Highway C o n -		Ontario	79	St. Louis	81
Columbia River		struction	77	Ottawa	79	San Antonio	81
Highway	74	Highway Engi-		Palisades	79	San Francisco ...	81
Concrete	74	neers	77	Pavements	80	Sand and Oil ...	81
Construction ...	76	Highway Maps ..	77	Paving	80	Side Hill	81
C o n s t r u c t i o n		Highway Material	77	Paving Materials	80	Sidewalks	81
Methods	76	Highways	77	Paving Specifica-		Slag	81
Contract Work ...	76	Holland	78	tions	80	Slipperiness ...	81
Crowning	76	Hudson Valley ..	78	Paving Statistics	80	South Dakota ...	81
Damaged Pave-		Hydrated Lime ..	78	Pennsylvania ...	80	Specifications ...	81
ments	76	Improvements ..	78	Philadelphia ...	80	Stone	81
Delaware	76	Johannesburg ...	78	Philippines	80	Stone Block	81
Drainage	76	Law	78	Pike's Peak	80	Street Cleaning ..	82
Earth Roads ...	76	Lime	78	Pittsburgh	80	Street Intersec-	
Federal Aid	76	London	78	Plank Road	80	tions	82

ROADS AND PAVEMENTS—(Continued)

Street Openings. 82	Supervision 82	Test Pavements. 82	Track Paving .. 82
Streets 82	Surfaces 82	Test Roads 82	Traffic 82
Street Sweeper .. 82	Surfacing 82	Texas 82	Wood 83
Subgrades 82	Surveying 82	Tire Widths 82	Wood Block 83
Sulphite Liquor. 82			

WATER SUPPLY

Aberdeen 83	Disinfection 87	Naugatuck River 91	Schenectady, N. Y. 94
Accounting 83	Drainage 87	New Mexico 91	Seattle 94
Air Lifts 83	Excelsior Springs, Mo. . 87	Niagara Falls .. 91	Siphons 94
Alabama 83	Fall River 87	Ohio Basin 91	Softening 94
Algae 83	Filters 87	Ohio Valley 91	South Bend, Ind. 95
Alum 83	Filtration 88	Oregon 91	Spillway Gates. 95
Analysis 83	Fire Protection. . 89	Oxygen Consumption .. 91	Standpipes 95
Aqueducts 83	Flow 89	Panama 91	Stream Pollution 95
Assessments 84	France 89	Phillippines 91	Surface Supply.. 95
Auxiliary Supply 84	Germany 89	Pipe Bends 91	Tanks 95
Baltimore 84	Gravel Wells 89	Pipe Joints 91	Taps 95
Beverly, Mass. . 84	Great Lakes 89	Pipe Lines 91	Texas 95
Bombay 84	Hamilton 89	Pipes 91	Throttling Gates 95
Boundary Waters 84	Havana 89	Power Estimates 91	Tropics 95
Brooklyn 84	Hibbing, Minn. . 89	Precipitation ... 91	Tunneling 95
Cambridge, Ohio 84	Hydrants 89	Plumbing 91	Tunnels 95
Camp Supply ... 84	Ice Troubles 89	Pumping 91	Typhoid 95
Canada 84	Intakes 89	Pumping Stations .. 92	Underground Water 95
Card Records ... 84	Iron Removal 89	Pump Testing 92	Valves 95
Catskill Aqueduct 84	Kansas 89	Purification 92	Venturi Meter . 96
Chem-Hydro-metry 84	Law 89	Rainfall 93	Victoria 96
Chlorination ... 84	Leakage 90	Records 93	Waste 96
Cleveland, O. ... 85	Legislation 90	Red water..... 93	Waterbury, Conn. 96
Coagulants 85	Lime 90	Reforestation ... 93	Water Powers . 96
Colorado River Basin 85	Los Angeles..... 90	Regis, Germany. 93	Water Pressure 96
Combined Plant. 85	Magnesia 90	Regulations 93	Water Rights . 96
Conduits 85	Mains 90	Reservoir Control 93	Watersheds 96
Corrosion 85	Manchester 90	Reservoirs 93	Water Testing . 96
Croton Watershed 85	Manganese 90	Review of 1915. . 94	Water Works .. 96
Cubic Performance 85	Manila 90	Riparian Rights. 94	Wells 96
Dam Failure ... 85	Massachusetts .. 90	Run-Off 94	Winnipeg 97
Dams 85	Medicine Hat ... 90	Russia 94	Winter Operation 97
Decolorization .. 87	Melbourne 90	St. John, N. B. . 94	Wood Pipes ... 97
Design 87	Meter Rates 90	St. John's Nfd. . 94	Wood-Stave Pipe 97
Development ... 87	Meters 90	Salem, Mass 94	
	Mississippi Valley 91	San Francisco .. 94	
	Montreal 91	Sanitation 94	

WATERWAYS AND HARBORS

Air Breakwater. 97	Cofferdam 98	Floods 100	Italy 101
Alaskan Ports.. 97	Colorado River . 98	France 100	Jetties 101
Astoria 97	Concrete 98	Galveston 100	Lake Michigan... 101
Barge Canal ... 97	Danube 98	Genoa 100	Lake Ports..... 101
Barges 97	Dikes 98	Glasgow 100	La Rochelle.... 101
Bayonne 97	Docks 98	Halifax 100	Levees 101
Belfast 97	Dredgers 99	Harbors 100	Lock Gates.... 101
Black Sea Ports 97	Dredges 99	Havana 100	Locks 101
Breakwater 97	Dredging 99	Humbolt Bay... 100	Log Conveyor... 101
Buffalo 97	Dutch Indies ... 99	Houston 100	Loire 101
Canals 97	Erosion 99	Illinois River... 100	Louisiana Intra-coastal Canal. 101
Channel Tunnel. 98	European Ports . 99	Inland Waterways 101	Mains 101
China 98	Flood Control... 99	International Waterways .. 101	Metal Flumes... 101
Coal Docks 98	Flood Prevention 99		Meters 101
Coal Pier 98			

CLASSIFICATION OF THE INDEX **WATERWAYS AND HARBORS—(Continued)**

11

Michigan102	Philadelphia ...102	River Diversion.103	Typhoid104
Mississippi	Philippines103	River Improve-	Valparaiso104
River102	Piers103	ment103	Venice104
Monaco102	Pier Structures.103	River Traffic...104	Warrior System.104
Muscle Shoals...102	Pollution103	Riveted Joints...104	Washouts104
New Orleans...102	Port Equipment.103	Rock Excavation.104	Waterpipe104
N. Y. Harbor...102	Port Facilities..103	San Francisco...104	Weirs104
New Zealand...102	Review of 1915..102	Shore Protection.104	Welland Canal..105
Niagara102	River and Har-	South America.104	Zuyder Zee....105
Omaha102	bor103	Stream Pollu-	
Panama Canal..102	River Control...103	tion104	

MISCELLANY

Camps105	Co-operation ...105	Locating Fires..105	Scotland106
Civil Engineer-	Design105	Military Engi-	Stumps106
ing105	Engineering ...105	neering105	Sugar Planta-
Channel Pro-	Engineers and	Military Engi-	tion106
jects105	Contractors ..105	neers106	Trenches106
Community	Forests105	Records106	Water Routes...106
Building105	Fortifications ..105	Review of 1915..106	Weather Bureau.106

ELECTRICAL ENGINEERING

COMMUNICATION

Acoustics107	Ground Anten-	Radio - Tele-	Telephone Law..110
Automatic Ex-	nas107	graphy108	Telephonometry.110
change107	Induction108	Radio Station..109	Telephony110
Automatic Tele-	Inductive Inter-	Radiotelephony.109	Telephone
phony107	ference103	Receivers110	Relays111
Cable Bug107	Interference108	Rotating Gap...110	Transmission
Cable Laying...107	Japan108	Splicing110	Standards ...111
Cable Losses...107	Jumper Wires...108	Speech Recorder.110	Transmitter111
Cables107	Microphones ..108	Standardization.110	Transmitters ..111
Crystal Detector.107	Poles108	Submarine	Underground
Cuba107	Pupin Coils....108	Cables110	Cables111
Faults107	Radiation108	Submarine Tele-	X-Rays111
	Radio Sets108	graphy110	

ELECTRO-CHEMISTRY

Ammonia112	Electric Fur-	Electroplating ..113	Primary Bat-
Batteries112	naces112	Iron Protection.114	teries114
Chlorine112	Electrochemistry.112	Italy114	Primary Cells...114
Contact Poten-	Electrodes112	Nitrates114	Rectifiers114
tials112	Electrolysis ...112	Nitrogen114	Refining114
Corrosion112	Electrolytic Pro-	Nitrogen Fixa-	Selenium Cells..114
Development ...112	cesses113	tion114	Storage Bat-
Dry Cells.....112	Electrometal-	Power Develop-	teries114
	lurgy113	ment114	Zinc Dust115

ELECTRO-PHYSICS

Air Conductivity.115	Continuous Cur-	Electro-magnetic	Energy116
Alternating Cur-	rent115	Machines116	Excess Voltages.116
rent115	Corona115	Electro mag-	"Fibrox"116
Arc115	Coupled Circuits.116	netism116	Fuses116
Arcs115	Currents116	Electro-magnets.116	Glow116
Coil Windings...115	Dielectrics116	Electroscopes...116	Harmonics116
Colloidal Solu-	Eddy Currents..116	Electrostatic Sep-	Heating116
tions115	Electrical	Induction117	High Voltage...116
Conductors115	Energy116	aration116	Impulse Cur-
Contact Electri-	Electrodes116	Emissivity116	rents116
fication115			Inductance117

ELECTRO-PHYSICS—(Continued)

Inductive Cir- cuits117	Oscillator118	Research118	Thermo - Electri- city119
Insulation117	Permeability118	Resistance118	Vibrations119
Interpoles117	Overloads118	Selenium118	Voltage Waves.....119
Ions117	Precipitation118	Skin Effect118	Wave Form.....119
Lightning117	Radiation118	Spark Effect ...119	Waves119
Magnetism117	Radiography ...118	Speaking Arc...119	Wave Shapes....119
Nickel Wire ... 117	Rays118	Terrestrial Mag- netism119	
Oscillations117	Reluctance118		

GENERATING STATIONS

Accumulators ..119	Distribution	North Dakota ..123	Saskatchewan ..124
Alabama119	Plant120	Nova Scotia ...123	Service124
Alaska - Tread- well119	Domestic Power.120	Niagara Falls...123	Shanghai125
Auxiliary Plants.119	Economics120	Office Buildings..123	Short-Circuits ..125
Birmingham, Eng.119	Electrical Sets..120	Oil-Engine Plant 123	Single - Phase Power125
British Columbia 119	Electric Heating.120	Oil Switches...123	Small Stations..125
Building Plants.119	Essex Plant121	Parallel Opera- tion123	Storage Bat- teries125
Buildings119	Fire Prevention.121	Peak Loads.....123	Storm Detectors.125
By-Product	Fuels121	Plant Equipment.123	Substations125
Power120	Glasgow121	Plant Operation.123	Supply125
Central Plants..120	Hospital Plant..121	Power123	Sweden125
Central Station	Hydro-Electric .121	Power Develop- ment123	Switchboard ...125
Practice120	Ice Trobules....122	Power Factor ..123	Switchgear126
Central Stations.120	Interborough ...122	Power Plants...124	Switching126
Chicago120	Interconnections.122	Private Plants..124	Switzerland ...126
China120	Isolated Plants 122	Protective Ap- paratus124	Syracuse, N. Y.126
Combination120	Johannesburg ..122	Providence124	Tasmania126
Combination	London122	Rates124	Tramway Sta- tions126
Plants120	Manila122	Reconstruction .124	Vladivostok ...126
Converters120	Manitoba123	Records124	Western Canada.126
Current Selling.120	Meters123	Reports124	Wheeling, W. Va.126
D. C. Station...120	Moscow123	St. Louis.....124	
Detroit120	Municipal Plants 123		
Dispatching120	New South Wales123		

GENERATORS AND MOTORS

A. C. Generators 126	Exciters128	Motor Appli- cations120	Poulsen-Arc130
A. C. Motors...126	Flashing128	Motor Classifica- tion129	Protection130
Alternators126	Generators128	Motor Design...129	Power Factor...130
Armatures126	Heating128	Motor Genera- tors130	Power Input...130
Balance127	High-Speed Gen- erators128	Motor Hire130	Railway Motors.130
Ball Bearings ..127	Illuminating En- gineering128	Motor Installa- tion130	Reversible Motors131
Brushes127	Incandescent Lamps128	Motor Mainte- nance130	Regenerative Control131
Carbon Brushes .127	Induction Generator128	Motor Size...130	Regulation131
Commutation ...127	Induction Motors129	Motor Tests...130	Residences131
Commutators ...127	Insulation129	Nomenclature ..130	Reversing131
Compensated	Interpole Ma- chines129	Oils130	Rotary Con- verters131
Generator127	Iron Losses ...129	Parallel Opera- tion130	Shunt Motors...131
Control127	Lighting Code ..129	Phase Compensa- tors130	Single Phase...131
Controllers127	Losses129	Polyphase Motors130	Small Motors...131
Converters127	Magnetic Flux.129		Speed Regula- tion131
Design128	Mine Motors...130		Stairways131
Generators128			Standardization.131
D. C. Machines.128			Starters131
D. C. Motors ...128			
Electrical Ma- chinery128			
Elevator Motors.128			

GENERATORS AND MOTORS—(Continued)

Streets131	Synchronous Motors132	Torque132	Ventilation132
Surges131	Three-Phase Generators132	Tractive Effort..132	Voltage132
Switchgear131		Turbo-Generator132	Windings132
Synchronous Alternators132			

ILLUMINATION

Absorption132	Electric Lamps..133	Lamps135	Reflection136
Animal Light...132	Electric Lighting133	Lamp Service ..135	Reflectors136
Arc Lamps.....132	Exposition Lighting133	Lectures135	Refractories136
Army Lighting..132	Eyes133	Legislation135	Searchlights136
Artificial Day Light133	Factories134	Light135	Series Lighting .136
Artificial Lighting133	Filaments134	Lighting135	Ships136
Auto mobile Headlights133	Flood-Lighting .134	Lighting Fixtures135	Shop Lighting..136
Auto mobile Lighting133	Flux134	Luminescence .135	Stage-Lighting .136
Candlepower133	Gas-Filled Lamps134	Luminous Equivalent135	Street Lighting.137
Churches133	Gas Lighting ..134	Mercury-Vapor Lamps135	Streets137
Color Mixture ..133	Good Lighting .134	Miniature Lamps135	Theater Lighting.137
Commercial Lighting133	Headlights134	Moore Tubes ..135	Theory137
Daylight133	Hefner Lamps..134	Motion Pictures.136	Train Lighting..138
Design133	Illuminants134	Museums136	Trains138
Development ..133	Illuminating Engineering134	Navy136	Tungsten Filaments138
Diffusing Surfaces133	Incan descent Arc134	Parabolic Mirrors136	Tungsten Wire..138
Diffusion133	Incan descent Lamps134	Philadelphia ..136	Ultra-Violet Radiation138
Earnings133	Industrial135	Photography136	Uniformity138
Edison133	Interiors135	Projection136	Vision and Brightness138
Efficiency133	Lamp Rating ...135	Radiation136	Voltage138
		Railway Cars ..136	Yellow Light...138

MEASUREMENT

A. C. Phenomena138	Efficiency139	Magnetism140	Standards142
Alternating Current138	Electric Furnaces139	Magnetometer ..140	Steel142
Ampere-Hour Meters138	Electric Units..139	Meters140	Stoneware142
Chemi-Hydro-metry138	Electromagnetic Units139	Molten Materials140	Stray Currents.142
Circle Diagram .138	Electroscopes ..139	Motor Testing..140	Stress142
Circular Currents138	Fans139	Oil-Switches ..141	Substations142
Converters138	Galvanometers .139	Oscillograms ..141	Telephonometry.142
Corona138	High Tension..139	Photometry141	Temperatures ..142
Current138	High Voltage..139	Porcelain Tests.141	Tester142
Current Meters.138	Hysteresis139	Potentiometer .141	Testing142
Curves138	Illumination ..139	Power Factor..141	Turbo-Generator142
Damped Oscillations139	Inductance139	Pyrometers141	Units142
Dielectrics139	Instruments ..139	Reactors141	Universal Switch142
Dynamometer ..139	Instrument Transformers.140	Recorders141	Voltage142
Dynamos139	Insulation140	Recording Meters141	Voltmeters142
Dynamo Testing139	Insulators140	Resistance141	Voltmeters143
Earth Plates...139	Ionic Velocities.140	Resistivity141	Watt-hour Meters143
	Iron Wire Tests.140	Rheostats141	Wattmeters143
	Light140	Short Circuits.142	Wave-Lengths .143
	Losses140	Small Machines.142	Waves143
	Luminosity140	Sphere Gap.....142	Winding143
		Standardization.142	

POWER APPLICATIONS

A. C. Driving...143	Bells143	Cement Mills...144	Coal Refining...144
Agriculture ...143	Bookbinding ...143	Cement Plants..144	Coke Manufacture144
Alternating Current143	Brick Making...143	Coal Handling..144	Control144
	Canada144	Coal Mining...144	

POWER APPLICATIONS—(Continued)

Cooking144	Fans145	Knife Manufac- ture146	Railroad Ma- chinery147
Cotton - s e e d Mills144	Farm Power ...145	Leather Making.146	Sawmills147
Cottrell Pro- cesses144	Flour Mills145	Machine Tools.146	Schools147
Crane Plant...144	Foundries145	Magnets146	Sewer Construc- tion148
Cranes144	Freight Ter- minals145	Maintenance ...146	Shoe Manufac- turing148
Domestic144	Fuel Economy .145	Manufacturing .146	Signaling148
Domestic Uses.144	Future Develop- ment145	Marble Plants...146	Silk Manufac- ture148
Electrical Indus- tries144	Garages145	Mill Drive.....146	Soap Manufac- ture148
Electric Cook- ing144	Gas Comparison.145	Mining147	Standardization.148
Electric Fur- naces144	Gear Making...145	Motor Applica- tions147	Steel Mills148
Electric Heat- ing144	Haulage145	Ore Reduction.147	Straggling In- dustries148
Electric Piano.144	Heating145	Ovens147	Textile Manufac- ture148
Electromagnets.145	Hoisting146	Paint Making...147	Tools148
Electro - Metal- lurgy145	H o t e l Equip- ment146	Paper Mill.....147	Water-Heaters .148
Elevators145	Hot Water146	Peanut Mills...147	Water Heating .148
Enameling145	Ice Harvesting .146	Piers147	Wheel Slip148
Explosives145	Ice - Making...146	Precipitation ..147	Woodworking ..148
Factories145	Implement Manu- facture146	Printing147	
	Industrial146	P u b l i s h i n g Plant147	
	I n d u s t r i a l Motors146	Pumping147	
		Pump Works...147	
		Quarrying147	

TRANSFORMERS

Abnormal Volt- ages148	Exciting Cur- rent149	Manhole Appara- tus149	Rectifiers150
Altitude Effect..148	Form Factor...149	Manufacture ...149	Selection150
A u t o t r a n s- formers149	High-Voltage ..149	Million-Volt ...149	Standardization.150
Connections149	Harmonics149	Oils150	Stresses150
Controlling Gear.149	Large Systems.149	Operation150	Tests150
Design149	Losses149	Phase Angle...150	Transil Oil....150
Efficiency149	Magnetizing Cur- rents149	Polarity150	Voltage150
		Protection150	Windings150
			Wiring150

TRANSMISSION AND DISTRIBUTION

Busbars150	Faults152	Line Protection .153	Storm Detectors.155
Cable Joints...150	Fuel Economy..152	Lines153	Strap Conduc- tors155
Cable Number- ing150	Fuses152	Losses153	Sub-Stations ..155
Cables150	Georgia - C a r o- lina152	New Haven R. R.154	Switches155
Calculation151	Grounding152	Office Buildings.154	Switchgear155
Carbon Tetra- chloride151	High Frequency.152	Oil Switches...154	Switzerland ...155
C i r c u i t Breakers151	High Pressure..152	Poles154	Systems155
Circuits151	High Tension...152	Pole Sockets...154	Telephones155
Concentric Wir- ing151	High Voltages.152	Protection154	Tempera t u r e Rise155
Conductors151	Hotels153	Reactances154	Testing155
Connections151	Inductance153	Reactors154	Three - W i r e System155
Earthing151	Inside Construc- tion153	Rectifiers154	Thury System..155
Economics152	Inspection153	Regulator154	Tower Lines...156
E l e c t r i c a l Faults152	I n s u l a t o r Failures153	Relays154	Towers156
Electrical En- ergy152	Insulators153	Report155	Underground ..156
Electric Waves.152	Iron Wire153	Rural Distribu- tion155	Voltage156
E l e c t r o s t a- tic Neutral...152	Lightning Protec- tion153	Service Prob- lems155	Wire Splices...156
	Line Disturb- ance153	Short Circuits...155	Wiring156
	Line Problems..153	Signaling155	Z Connection ..156
		Stations155	Zinc Wires....156
		Stevedores155	

MISCELLANY

Australasia156	Electrical Engi- neering156	Electric Service.157	Standardization.157
Coating Paper..156	Electrical Indus- try157	Inspection Rec- ords157	United States ..157
Construction ...156	Electrical Trade.157	Italy157	Western Elec- tric157
Diagrams156	Electricity157	Reviews of 1915.157	Westinghouse ..157
Electrical Code..156			
Electrical Dia- grams156			

INDUSTRIAL MANAGEMENT

EDUCATION

Applied Science.158	Cripples159	Industrial Train- ing160	Railway Work...161
Apprentices158	Crysallography.159	Laboratories ...160	Research161
Apprenticeship .158	Education159	Machine Design.160	Shop Courses ...161
Central - Station Training158	Employees159	Managers160	Shop Instruction.161
Chemistry158	Engineering159	Military Aca- demy160	Shop Schools...161
Coal Mining158	Engineers' Eng- lish160	Mining160	South America..161
Colleges158	Experiment Sta- tions160	Motion Pictures.160	Street - Railway Employees161
College Training.159	Foundry Work..160	Municipal School160	Technical162
Colliery Man- agers159	India160	Naval Academy.161	Training162
Commercial Work159	Industrial Educa- tion160	Naval Engineers.161	Trade Instruc- tion162
Co-operation159	Industrial Hy- giene160	Polytechnic161	Universities ...161
Co-operative159	Industrial La- boratories160	Post - Graduate Schools161	Vocational161
Co-operative Courses159	Industrial Ser- vice160	Power Plant....161	Vocational Selec- tion162
Co-operative Schools159		Progress161	Vocational Tests.162

FINANCE AND COSTS

Accounting162	Cost Systems...164	Mine Account- ing165	Railway Valua- tion166
Bonus Systems..163	Depreciation ...164	Mine Valuation.165	Review of 1915.1915
Chemistry163	Drawings164	Mining165	Securities166
City Finance...163	Earnings164	Mining Stocks..165	Selling166
Coal Land Valua- tion163	Expense Distri- bution164	Mining Stocks..165	Sewer Construc- tion167
Coal Mines....163	Exports165	Municipal Ac- counting165	Storekeeping ...167
Commerce163	Foundry Costs..165	Paving Assess- ments165	Swiss Industries.167
Contract Esti- mating163	Gold165	Power Cost165	Trade167
Contracting Ac- counting163	Graphics165	Power Plants...166	Trade Associa- tions167
Conversion Tables163	High way Ac- counting165	Prices166	Trade Financing.167
Cost Accounting.163	Ice Business...165	Public Utilities.166	Unit Costs167
Cost Analysis .163	Idle Plant....165	Public - Utility Valuation166	Unit Prices....167
Cost Department.163	Insurance165	Purchasing166	Utility Bonds...167
Cost Keeping...163	Inventories165	Railway Ac- counting166	Valuation167
Cost Estimating.164	Irrigation165	Railways166	Wages168
Costs164	Natural - Gas Valuation165		Water Power...169
	Mexico165		Water-Works ..169

MANAGEMENT

Administration .169	Consent169	Employment170	Factory Dis- tricts171
Bonuses169	Construction ...169	Equipment170	Factory Engi- neering171
Bonus System...169	Contracting169	Executives' Club.171	Factory Heating.171
Central Stations.169	Co-operation169	Factory Build- ings171	Factory Illumina- tion171
Chemical Indus- tries169	Efficiency170	Factory Con- struction171	Factory Losses..171
Collective Bar- gaining169	Efficiency Methods170		
	Eight-Hour Day.170		

MANAGEMENT—(Continued)

Factory Ventilation	171	Navy Yards	172	Railway Store-keeping	173	Stock Keeping	174
Ford Shops	171	Organization	172	Sales Department	173	Store-Keeping	174
Foundry Operations	171	Personal Relationship	172	Scientific Management	173	Street Railway Shops	174
German Railways	171	Personnel	172	Selling	174	Strikes	174
Industrial Management	172	Piecework	172	Shop Practice	174	Taylor System	174
Industrial Power	172	Planning System	172	Shop System	174	Telephone Plant	174
Industrial Village	172	Power-Plants	173	Special Industries	174	Three-Shift Plan	174
Labor	172	Production	173	Steam Generation	174	Time Keeping	174
Labor Supply	172	Profit Sharing	173	Stock Department	174	Time Study	174
Motion Study	172	Promotion	173			Wage Controversy	174
Motor Trucks	172	Publicity	173			Wage Systems	174
		Purchasing	173			Women Workers	175
		Railroad Shops	173				

REGULATION

Arbitration	175	Government Control	175	Patent Law	176	Standardization	177
British Metal Industries	175	Government Ownership	175	Patents	176	Strikes	177
Chemistry	175	I. C. C.	175	Preparedness	176	Taxation	177
Conservation	175	Industry	175	Public Service Commissions	176	Telephones	177
Eight-Hour Day	175	Labor	175	Public-Utilities	176	Trade Unions	178
Engineering Practice	175	Labor Laws	176	Public Works	177	Wage Controversy	178
Engineers' Examinations	175	Labor Legislation	176	Railroads	177	Wages	178
Ethics	175	Legislation	176	Railway	177	Water	178
Federal Trade Commission	175	License Law	176	Railway Regulation	177	Water Power	178
Foundries	175	Natural Resources	176	Railways	177	Water Supplies	178
				Railway Strike	177	Water Use	178

WELFARE AND SAFETY

Abrasive Wheels	178	Elevators	179	Lightning Protection	181	Rescue Work	182
Accident Prevention	178	Employees' Organization	180	Lumber Piling	181	Safeguarding	182
Accidents	178	Factory Lighting	180	Machine Shops	181	Safety Code	182
Air Compressors	178	Fire Protection	180	Malaria	181	Safety Council	182
Ammunition Making	178	Forging	180	Material Handling	181	Safety Engineering	182
Asphyxiation	178	Foundries	180	Metal-Mine Accidents	181	Safety Engineers	182
Automobiles	178	Foundry Ventilation	180	Mine Accidents	181	Safety Lamps	182
Blast Furnaces	179	Grinding	180	Mine Housing	181	Safety Standardization	182
Box Making	179	Gasoline	180	Mining	181	Sand Blasting	182
Carnegie Steel	179	Health	180	Mine Safety	181	Sanitation	182
Chains	179	Heating Boiler	180	Municipal Engineers	181	Shop Hygiene	182
Clubs	179	Hoisting	180	Nystagmus Diseases	181	Social Relations	182
Coal and Coke	179	Hookworm	180	Occupational Diseases	181	Social Work	182
Coal Mining	179	Housing	180	Painters' Scaffolds	181	Steel Plants	182
Coke-Oven Accidents	179	Human Factors	180	Public Utilities	181	Street Railways	182
Coke Ovens	179	Industrial Diseases	180	Quarrying	182	Theaters	182
Cranes	179	Industrial Hygiene	180	Railroads	182	Typhoid	182
Cripples	179	Injuries	180	Refrigeration	182	Vibration	182
Electrical	179	Labor	180	Rescue Apparatus	182	Water Tanks	182
Electrical Plant	179	Lead Poisoning	180			Welfare	182
Elevator Accidents	179	Lighting	181			Welfare Work	182
Elevator Hazards	179					Workmen's Compensation	183

MISCELLANY

- | | | | |
|-----------------------------------|------------------------------------|--------------------------------------|--------------------------------------|
| Belgium183 | England184 | Industrial Pre-
paredness185 | Preparedness ...186 |
| Bureau of Stand-
ards183 | Exhibitions184 | Inventions185 | Presidential Ad-
dresses186 |
| Chemical Indus-
try183 | Expert Testi-
mony184 | Labor Legisla-
tion185 | Railways and
Ports186 |
| Chemical Trade.183 | Explosives184 | Law and Engi-
neering185 | Research186 |
| Chemistry183 | Exporting184 | Load Factor....185 | Russia187 |
| Co-ordination ..183 | Fertilizers184 | Mathematics of
War185 | Russian Power..187 |
| Dutch Naviga-
tion183 | Forestry184 | Merchant
Marine185 | Science187 |
| Dye Industry ..183 | Foreign Invest-
ment184 | Military Engi-
neering185 | Selling Methods.187 |
| Dyestuffs183 | French Industry.184 | National
Defense185 | Siberia187 |
| Economic Re-
sources183 | Fuel184 | Niagara Falls..186 | Southern States.187 |
| Economics183 | Gas Lighting ...184 | Pacific Coast..186 | Steel Industry..187 |
| Efficiency183 | German Com-
merce184 | Patents186 | Technical Com-
pounds187 |
| Engineering
Problems183 | Germany185 | | Trade187 |
| Engineer's
Status184 | Incomes185 | | War Effects ...187 |
| | Industrial Chem-
istry185 | | Women Ma-
chinists187 |

MARINE AND NAVAL ENGINEERING

- | | | | |
|-----------------------------------|--------------------------------------|---------------------------------|---------------------------------|
| American Navy.188 | Electrical Equip-
ment190 | sion192 | Ship Design195 |
| Anchors188 | Electricity190 | Merchant
Marine192 | Ship Perform-
ance195 |
| Anchor Winches.188 | Electric Propul-
sion191 | Mine-Laying
Submarine ...192 | Ship Trim.....195 |
| Backing Trials.188 | Electric Steer-
ing191 | Mine Sweeping.192 | Shipyards195 |
| Barges188 | Engine Control.191 | Model Experi-
ments192 | Ships' Tools...195 |
| Battle Cruisers.188 | Engines191 | Motor Ships...192 | Skin Friction...195 |
| Battleship Cast-
ings188 | European Trans-
portation191 | Naval Service..192 | Stability195 |
| Battleships188 | Evaporators191 | Naval Stations..193 | Stabilizers195 |
| Bearings188 | Ferry Boat....191 | Navy Yards ...193 | Stabilizing
Ships195 |
| Bilge-Keels188 | Fire Float....191 | Oil Burning....193 | Steam Plants...196 |
| Blowers188 | Fleet Main-
tenance191 | Oil Engines ...193 | Steamers196 |
| Boilers188 | Foreign Trade..191 | Periscope193 | Steamships196 |
| British Engines.189 | Freeboard191 | Power Boats...193 | Steamship Ser-
vice196 |
| Bulkheads189 | German Navy..191 | Preparedness ..193 | Steel Boats....196 |
| Bunkers189 | Gunboats191 | Projectiles193 | Steering196 |
| Cannon189 | Gyroscope Com-
pass191 | Propellers193 | Stresses196 |
| Car Ferries189 | Gyroscopes ...191 | Propeller Shafts.193 | Submarine
Engines196 |
| Cargo Handling.189 | Gyro-Stabilizer..191 | Propulsion193 | Submarine
Mother196 |
| Channel Ferry..189 | Harbor Defense.191 | Pumps194 | Submarine
Tender196 |
| Coast Defense..189 | Hog and Sag...191 | Refrigerator
Ship.....194 | Submarines ...196 |
| Coal Docks....189 | Inclining Experi-
ments191 | Repairing194 | Superheated
Steam196 |
| Coaling Stations.189 | Interior Decora-
tions191 | Resistance194 | Survey Steamer.196 |
| Colliers189 | Launching191 | River Steamers..194 | Telegraph
System197 |
| Collisions189 | Lighterage191 | Riveting194 | Test Station ...197 |
| Corrosion189 | Lighthouses ...192 | Russia194 | Thrust Block...197 |
| Cranes189 | Lighthouse Ten-
der192 | Sail Experi-
ments194 | Timber197 |
| Cruisers189 | Lighting192 | Salvage194 | Torpedo-Boats .197 |
| Derelicts189 | Lloyds192 | Salvaging194 | Tugs197 |
| Design190 | Load Lines192 | Searchlights ...194 | Turbines197 |
| Destroyers190 | Lubrication ...192 | Shafting194 | U. S. Navy.....197 |
| Diesel Engines..190 | Marine Propul-
sion192 | Shafts195 | Vibration197 |
| Diesel Ships...190 | | Ship Auxiliaries.195 | Wave Motion ...197 |
| Diving Appara-
tus190 | | Ship Brakes....195 | |
| Dredges190 | | Shipbuilding ...195 | |
| Dredging190 | | Ship Deflection..195 | |
| Docks190 | | | |
| Dry Docks190 | | | |
| Economics190 | | | |

MECHANICAL ENGINEERING

AERONAUTICS

Accidents198	Balloons199	Flying Boats....199	Propellers200
Aero-Motor198	Boilers199	Following - Plane	Radiators200
Aeronaucic	Catapults199	Machines199	Radius of Action.200
Engines198	Clothing and	Hangars199	Review of 1915.200
Aeroplane	Equipment ...199	Hydro - Aero-	Signaling200
Engines198	Design199	planes200	Specifications ...200
Aeroplanes198	Dirigibles199	Military200	Sperry Pilot....200
Aeroplane	Engines199	Planes200	Triplane200
Wings199	Engine Testing.199	Propeller Hubs.200	Wind Effect200
Aircraft199	Factories199	Propeller Ma-	Wind Tunnels...200
Air Service....199	Flying199	chine300	Zeppelins200
Airships199			

AUTOMOBILES

Accumulators ..200	Engine Cycles ..202	Lubrication205	Russian Indus-
Armored Cars ..200	Engine Rating..203	Magnetos205	try208
Army Trucks...201	Engines203	Manifolds206	Sand Spreaders.208
Assembling201	Farm Tractors..203	Military206	Speed Gears ...208
Axles201	Frames204	Motor Buses...206	Speedometer ...208
Bevel-Gearing ..201	Front Drive....204	Motor Tests...206	Springs208
Brakes201	Fuels204	Motor Trucks..206	Standardization.208
Carburetors ...201	Gear Box.....204	Nomenclature ..207	Starters208
Car Tests.....201	Gear Changing..204	Omnibuses207	Steam Car.....208
Chain Drives...201	Gear Control...204	Performance ...207	Steering208
Chassis Testing.201	Gears204	Pistons207	Storage Bat-
Constant Pres-	Gearsets204	Presidential Ad-	teries208
sure201	Glare204	dress207	Street Flushers.208
Cooling201	Governors204	Production207	Suspension208
Crankshafts ...202	Headlights ...204	Progress207	Taxation208
Cylinders202	Hospital Car...205	Prospects207	Tires209
Design202	Ignition205	Racing Cars...207	Traction209
Differentials ..202	Indicators205	Radiators207	Tractors209
Differential Sub-	Industrial Trac-	Rear Axles ...207	Traffic209
stitutes202	tors205	Rectifiers207	Trailers209
Electrical Equip-	Industrial	Refrigerator	Transmission ..209
ment202	Trucks205	Automobiles ..207	Universal Joint.209
Electric Trans-	Italian Industry.205	Repairs207	Valves209
mission202	Jet Control....205	Road Locomo-	Wheels210
Electric Trucks.202	Kitchen Cars ..204	tives207	Worm Drives...210
Electric	Lighting205	Road Traction ..208	Worm Gear210
Vehicles202			Wrecked Cars...210

COMBUSTION MOTORS

Air Compres-	Diesel Engines..210	Gas Engine	Humphrey
sors210	Diesel Plant...211	Plants211	Pump212
Blast - Furnace	Engines211	Gas Engines ...211	Ignition212
Gas210	Engine Testing.211	Gasoline211	Jacketing212
Brons Engine..210	Engine Vibra-	Gasoline	Nomenclature ..212
Carburetors ...210	tion211	Engines211	Oil Engines ...212
Combined Plants.210	Exhaust Gases..211	Gas Power	Power212
Combustion	Farm Engines..211	System212	Power Plants ..213
Cycles210	Fuels211	Gas Producers ..212	Producer Gas ..213
Compression ...210	Gas Combustion.211	Generator Gas..212	Semi - Diesel
Cylinders210			Engines213
			Waste Heat...213

HEATING AND COOLING

Air Conditioning.213	Bernoulli's Prin-	Central Plants..213	Churches213
Air Washing...213	ciple213	Central - Station	Cold Storage...214
Ammonia213	Boilers213	Heating213	Combination
Ammonia Com-	Calcium213	Central Sta-	Plants214
pressors213	Car Heating....213	tions213	Conservatory ...214

HEATING AND COOLING—(Continued)

Creamery Refrigeration	214	Heating Coils.....	214	Light and Heat.....	216	Refrigerating Plants.....	217
District Heating.....	214	Heat Loss.....	214	Light and Refrigeration	216	Refrigeration	217
Distribution System	214	Heat Transmission	214	Neutral Zone.....	216	Research	218
Ducts and Flues	214	Hot - Air Furnaces	215	Office Buildings.....	216	Schools	218
Economics	214	Hot - Water Heating	215	Oil Heating.....	216	Skating Rink.....	218
Electric Heating.....	214	Humidity	215	Operating Cost.....	216	Steam Heating.....	218
Equitable Building	214	Ice	215	Overhauling	216	Thermal Insulators	218
Exhaust Steam.....	214	Ice Making	215	Pipe Lines.....	216	Thermodynamics	218
Factory Heating	214	Ice Plants.....	215	Pipe Supports.....	216	Vacuum Heating	218
Filtration	214	Institution Plants	215	Piping	216	Ventilation	218
Furnaces	214	Insulation	216	Piping Chart.....	216	Warehouses	219
Gas Heating.....	214	Laboratories	216	Progress	216	Water Purification	219
Heating	214	Laws	216	Publicity	216	Windows	219
				Radiation	216		
				Radiators	217		
				Recirculation	217		

HYDRAULIC MACHINERY

Air Lift	219	Erosion	219	Oil - Engine Pumps	219	Screw Pumps.....	220
Air-Pumps	219	Fire Pumps.....	219	Pumping Plants	219	Turbines	220
Centrifugal Pumps	219	Flumes	219	Pumping Units.....	220	Valves	220
Chemical - Hydro-metry	219	Humphrey Pump	219	Pumps	220	Valve Wear	220
Discharge Accelerator	219	Hydraulic Presses	219	Pump Tests	220	Water Brake.....	220
		Marine Pumps.....	219			Water Power.....	220
						Waterwheels	221

MACHINE ELEMENTS AND DESIGN

Automatics	221	Fixtures	221	Machine Proportioning	222	Shafts	223
Balancing	221	Gages	221	Machine Tools.....	222	Shell Tools.....	223
Ball Bearings	221	Gears	222	Pipe	222	Spanners	223
Cone Couplings	221	Gear Teeth	222	Pipe Threads.....	222	Spirals	223
Crank Pins.....	221	Helical Gears.....	222	Planing Machinery	222	Springs	223
Cranks	221	Indexing	222	Proportion	222	Sprockets	223
Critical Speeds.....	221	Jig Bushings	222	Pump Impellers.....	222	Spur-Gearing	224
Cutting Edge.....	221	Jigs	222	Screw Gages.....	222	Standardization	223
Design	221	Lathes	222	Screw Presses.....	222	Threads	223
Dies	221	Limit Gages.....	222	Screws	223	Tool Engineering	223
Engine Design.....	221	Machine Design.....	222			Tools	223
Fireboxes	221						

MACHINE WORKS AND FOUNDRIES

Aluminum Drawing	223	Case Hardening.....	224	Electrical Apparatus	226	Foundry Practice	227
Ammunition	223	Castings	224	Electric Furnaces	226	Foundry Problems	228
Annealing	223	Chain	225	Electric Machinery	226	Foundry Progress	228
Arms	224	Chamfering	225	European Tools.....	226	Fuel	228
Assembling	224	Channeling	225	Factories	226	Fuel Domes.....	228
Automatic Control	224	Chisels	225	Fixtures	226	Gas Cutting.....	228
Automatic Devices	224	Chucks	225	Flasks	226	Gas Furnaces.....	228
Automatic Machines	224	Copper	225	Flue Welding.....	226	Gatings	228
Billiard Balls.....	224	Cores	225	Flywheels	227	Gear-Cutter	228
Boring	224	Cupola Melting.....	225	Forging	227	Gear Machine.....	228
Brass	224	Cupolas	225	Forging -Presses.....	227	Gears	229
Brass Founding.....	224	Cutting	226	Foundations	227	Gear Wheels	229
Cartridge Cases.....	224	Die Casting.....	226	Foundries	227		
Car Wheels.....	224	Dies	226	Foundry Coke.....	227		
		Drafting	226	Foundry Office.....	227		
		Drill Steel.....	226				
		Drop Forging.....	226				
		Drop-Hammers.....	226				

MACHINE WORKS AND FOUNDRIES—(Continued)

Grinding229	Machine Founda- tions230	Punching Ma- chines233	Special Ma- chines235
Hardening229	Machining230	Records233	Springs235
Heat Treatment.229	Machine Tools.231	Rifles233	Stamping235
High-Speed Ma- chinery230	Milling231	Riveting233	Steel Castings.235
Holding De- vices230	Milling Fixtures.231	Routing233	Steel Helmets.235
Imprinting230	Molding231	Sand Blast.....233	Tempering235
Ingots230	Molding Ma- chines231	Sand Prepara- tion233	Tool Drawings.236
Inspection230	Molding Sand.231	Saws233	Tool Equipment.236
Japanning230	Munitions231	Schoop Pro- cess233	Toolroom236
Jigs230	Non - Ferrous Casting231	Scrap233	Tools236
Keys230	Painting232	Scraping233	Tooth-Rests236
Lacquering230	Patterns232	Screw Machines.233	Tube Mill236
Lathe230	Planing232	Screw Threads.234	Tumbling236
Lathe Control.230	Portable Shops.232	Sherardizing ...234	Tunnel Linings.236
Lathes230	Press-Work232	Shop Practice.234	Turret Lathe...236
Lathe Work....230	Projectiles232	Shops235	Vises236
Limit Gages....230	Pulleys233	Signal Systems.235	Washed Metal.236
Limit System...230			Welding236
Machine Con- trol230			Wire Drawing.237
			Wire Rods237

MATERIALS OF CONSTRUCTION

Abrasives237	Electric Steel...240	Metallography ..242	Shell Material .243
Alcohol238	E l e c t r o l y t i c Iron240	Metal Reserves.242	Sherardizing ..243
Allotropy238	Explosives240	Metal Supplies.242	Shop Chemicals.243
Alloys238	Ferrous Alloys.240	Monel Metal ...242	Silica Brick...243
Alloy Steel....238	Firebrick240	Nickel - Copper Alloys242	Silicon Steel...243
Aluminum238	Forgings240	Nickel - Silver.242	Sizing243
Aluminum Dust.238	Glass240	Non-Ferrous Al- loys242	Specifications .243
Armor Plate...238	Ghost Lines...240	Old Metal242	Steel243
Bearing Metals.238	Hardness240	Open-Hearth ...242	Steel Castings.244
Belting238	Hydrogen240	Paper Yarn242	Steel Impurities.244
Benzol238	Insulating Mate- rials240	Pig Iron.....242	Tars244
Boiler Plugs...238	Insulation240	Pipe242	Textiles244
Brass238	Invar240	Pipe Failure...242	Tin - Aluminum Alloys244
Bronze239	Iron Alloys....240	Pipe Flanges...242	Tool Steel....244
Cast Iron239	Iron and Steel.241	Platinum Ware.242	Vacuum - Fused Iron244
Cements239	Linseed Oil....241	Pure Iron.....243	Vanadium244
Chlorine239	Lubricants241	Recalcence243	Varnish244
Chrome Steel...239	Magnesium241	Refractories ...243	Wire244
Copper239	Malleable Iron.241	Rivet Steel....243	Wire Rope....244
Copper Alloys.239	M a n g a n e s e - Bronze241	Rope243	Wood Flour ...244
Corrosion239	M a n g a n e s e Steel241	Rubber243	Wrought - Iron Pipe244
Crystallization.239	Metal Decay...242	Rustless Alloys.243	Zinc Bronze ...244
Crystal Struc- ture240		Scrap243	
Elastic Limit..240		Semi-Steel243	
E l e c t r i c F u r - naces240			

MEASUREMENT

Acetylene245	Calorimeters ...245	Currents245	Flow246
A i r C o m p r e s - sors245	Charts245	Curve Formulae.245	Flow Meters...246
Anemometer ...245	Combustion In- struments ...245	Deformation ...245	Flue-Gas246
Angular Work.245	Computer245	Densitometer ...245	Fuel Gas246
Automatic Calcu- lators245	Convex Heads...245	Ductility246	Gaging246
Balance245	Conveyor Belts.245	Dynamometer ...246	Gases246
Bar Test.....245	Cottrell Process.245	Engine Founda- tions246	Gauges246
Boiler Meters...245	Covers245	Fan Calculations.246	Gyroscopic Ap- paratus246
		Fatigue246	Hardness246

MEASUREMENT—(Continued)

Heat	246	Lubrication	247	Pumps	248	Steam Flow	249
Heat Balance	246	Magnetic Test-		Pyrometry	248	Steam Piping	249
Heat Transmis-		ing	247	Radiation	249	Steam Tables	250
sion	246	Manometers	247	Reciprocating		Steel	250
Horse-Power	247	Metallography	247	Parts	249	Steel Testing	250
Humidity	247	Metal Testing	248	Rings	249	Strength of	
Hydraulics	247	Metric System	248	Riveted Joints	249	Metals	250
Hydrometer	247	Nozzles	248	Rivet Strength	249	Stresses	250
Hydrometer		Numerals	248	Rubber	249	Synthesizer	250
Scales	247	Oil Flow	248	Scales	249	Tanks	250
Hydrometry	247	Pallograph	248	Screw Gages	249	Temperature	250
Impact	247	Pipe Flow	248	Shaft Calibra-		Thermodynamics	250
Indicator Dia-		Pipe Stresses	248	tion	249	Threads	250
grams	247	Pistons	248	Shafts	249	Turbine Blades	250
Iron Analysis	247	Planck's Law	248	Sieves	249	Turbine Effici-	
Iron Spectrum	247	Planimeters	248	Sizing	249	ency	250
Keys	247	Power-Plant Re-		Spectroscopes	249	Valve Diagram	250
Laboratories	247	corders	258	Speed Sighting	249	Viscosity	250
Laboratory		Psychrometry	248	Spur-gear Teeth	249	Weights	250
Work	247	Pumping	248				

POWER AND TRANSMISSION

Air Compres-		Chain Drive	251	Lubricants	252	Power Supplies	252
sors	251	Compressed Air	251	Lubrication	252	Prime Movers	252
Belt-Drive	251	Compressors	251	Motive Power	252	Shafting	253
Belts	251	Construction		Motor Drive	252	Signaling	253
Blowing Engines	251	Plants	251	Power	252	Steam Hammers	253
Building Vibra-		Factory Plants	251	Power Cost	252	Waste Heat	253
tions	251	Fuel Economy	251	Power Plants	252	Water Power	253
Cement Plant	251						

STEAM ENGINEERING

Baffles	253	Combustion	256	Governors	258	Smoke Pre-	
Balanced Draft	253	Combustion Im-		Heat Conduction	259	vention	260
Blower	253	provers	256	Heat Transmis-		"Soot"	260
Boiler Code	253	Compound		sion	259	Soot Blowers	260
Boiler Corrosion	253	Engines	256	High Pressures	259	Stacks	260
Boiler Design	254	Condensation	256	Inspection	259	Steam Accumu-	
Boiler Economy	254	Condensers	257	Losses	259	lators	260
Boiler Explo-		Condenser Tubes	256	Lubrication	259	Steam Charts	261
sions	154	Condensing	257	Marine Boilers	259	Steam Flow	261
Boiler Fuel	254	Cooling Towers	257	Oil Burning	259	Steam Plants	261
Boiler Furnaces	254	Cooling Water	257	Oil Fuel	259	Steam Traps	261
Boiler House	254	Costs	257	Peat Fuel	259	Stokers	261
Boiler Inspection	254	Draft	257	Performance	259	Stoking	261
Boiler Joints	255	Draft Gages	257	Pipe Drainage	259	Superheaters	261
Boiler Loads	255	Economizers	257	Piping	259	Superheating	261
Boiler Opera-		Efficiency	257	Powdered Coal	259	Surface Combus-	
tion	255	Engine Efficiency	257	Power-Plant Op-		tion	261
Boiler Perform-		Engines	257	eration	259	Traveling	
ances	255	Evaporators	257	Power Plants	259	Screens	261
Boiler Plants	255	Exhaust Steam	257	Prime Movers	260	Turbines	261
Boiler Practice	255	Feed Pumps	257	Pulverized Coal	260	Turbo-Genera-	
Boiler Problems	255	Feed Water	257	Pulverized Fuel	260	tors	262
Boiler Regulator	255	Feed - Water		Receivers	260	Uniflow Engines	262
Boilers	255	Heaters	258	Recorders	260	Valve Dia-	
Boiler Settings	256	Flue Gases	258	Regulators	260	grams	262
Boiler Tests	256	Fuel Economy	258	Revolving		Valve - Gears	262
Boiler Tubes	256	Fuel Purchasing	258	Pistons	260	Valves	262
Chimneys	256	Fuels	258	Safety Valves	260	Valve Testing	262
Coal Purchasing	256	Furnaces	258	Smoke	260	Waste Heat	262
Coke Fuel	256	Gas Explosions	258	Smoke Abate-			
Combined Plants	256	Gas Fuel	258	ment	260		

TRANSPORTING AND CONVEYING

Ash Conveyors..262	Electric Lifts...264	Hoists264	Pipe Lines265
Belt Conveyors..262	Elevators264	Industrial Railways264	Pneumatic Transportation265
Cableways263	Escalators264	Lifting Appliances264	Ropeways265
Car Dumpers ...263	Freight Handling264	Material Handling264	Ship building Cranes265
Car Dumping ..263	Gas Works ...264	Ore Handling..264	Telpher System..265
Coal Handling..263	Grab Buckets..264	Overhead Travellers265	Traverser265
Coal Storage...263	Grain Handling..264		Trolley Hoists..265
Conveyors263	Handling Equipment264		
Cranes263			
Derricks263			

MISCELLANY

Acetylene265	Cotton - Opening Machinery265	Glass265	Review of 1915..266
Agricultural Show265	Dyestuffs Factories265	Glass Industry..266	Science266
Artificial Limbs..265	Explosions265	India266	Tanning Industry266
Bayonets265	Explosives265	Magnetic Hand..266	Textile Machinery266
Chemical Apparatus265	Fire Waste265	Munitions266	Tree Felling...266
Clay Wares....265		Panama - Pacific266	

MINING AND METALLURGY

BASE METALLURGY

Accounting267	Copper Smelteries268	Leaching269	Review of 1915..270
Assay267	Cottrell Process..268	Lead269	Siberia270
Ashio267	Crystallization ..268	Lead Metallurgy269	Slag Uses270
Bag-Houses267	Crystallography..268	Lead Refining..269	Smelter Smoke..270
Braden267	Dust Losses....268	Lead Roasting..269	Smelting270
Blast Furnaces..267	Electric Furnaces268	Lead Smelting..269	Spelter270
Channing, J. Parke267	Electrolytic Copper268	Lead Sulphate..269	Tin270
Chuquicamata ..267	Electrolytic Zinc268	Lead-Zinc269	Tin Extraction..270
Concentrates ..267	Electrostatic Separation ..269	Metallurgy269	Washoe Works..270
Consolidated Arizona267	Enrichment269	Mines Report ..269	Zinc270
Copper267	Furnace Linings..269	Nickel269	Zinc Blast Furnace270
Copper Determination ..268	Hall Process ..269	Non - Ferrous Metals269	Zinc Calcination..270
Copper Leaching..268	Hydro metallurgy269	Oxygen - Iron Torch269	Zinc-Lead270
Copper Metallurgy268	International Smeltery269	Pulverized Fuel..269	Zinc Metallurgy..270
Copper Refining..268		Pyritic Smelting..270	Zinc Oxide271
Copper Reverbatories..268		Quicksilver ...270	Zinc Recovery..271
		Refining270	Zinc Smelters..271
			Zinc Works ...271

COAL AND COKE

Accidents271	Coal272	Coal Resources..274	Examination ..275
Alberta271	Coal Analysis...273	Coal Storage...274	Explosions275
Anthracite Sizes..271	Coal and Iron...273	Coal-Tar Colors..274	Fire-Damp275
Belgium271	Coal Breakage..273	Coal Trade.....274	Firedamp Detector275
Blackdamp271	Coal Breakers..273	Coke274	Fires275
Boreholes271	Coal Classification273	Coke Manufacture274	Gaseous Ignition..275
Briquetting271	Coal Conveyors..273	Coke Ovens....274	Gas Producers..275
Byproduct Coke..271	Coal Cutters...273	Collieries274	Geology276
Ovens271	Coal Dust273	Colliery Materials275	Germany276
Byproducts271	Coal Fields....273	Conservation ..275	Gob Fires.....276
Canada272	Coal Lands274	Conveyors275	Haulage276
Chemistry272	Coal Oil274	Efficiency275	Illinois276
Clean Coal.....272	Coal Preparation274	Electricity275	India276
Clinkering272			Inspection276

COAL AND COKE—(Continued)

Inspectors	276	Newdownland	278	Resources	279	Stripping	280
Italy	276	New Zealand	278	Reviews of 1915	279	Surface Plant	280
Jigging	276	Nitric Acid	278	Rhode Island	279	Tipples	280
Kansas	276	Nova Scotia	278	Roof Cave	279	Trade	280
Kentucky	277	Oxfordshire	278	Roof Support	279	Transfer Plant	280
Lamps	277	Oxidation	278	Safety Lamps	279	Turkey	280
Lancashire	277	Peat	278	Sampling	279	Utah	280
Lignite	277	Philippines	278	Screening	279	Wales	280
Machine Mining	277	Pittsburgh	278	Shot Firing	279	Washery	280
Mine Fires	277	Powdered Coal	278	South America	279	Washing	280
Mine Gas	277	Power	279	Spitzbergen	279	Waste	280
Mining Methods	277	Pulverized Coal	279	S p o n t a n e o u s		Water Content	280
Mining Plants	277	Pumping Plant	279	Combustion	279	Western Austra-	
Moisture	278	R e c o v e r y		Steam Engines	280	lia	280
Montana	278	Methods	279	Storage-Battery		Winding	280
Munitions	278	Replacement	279	Locomotives	280		

GEOLOGY

Alaska	281	C o p p e r S u l-		Maryland Cop-		Sericite	283
Arizona	281	phides	281	per	282	Strata Calcula-	
Bibliography	281	Cuba	281	Microscopy	282	tions	283
Bingham	281	Enrichment	281	Montana	282	Sudbury	283
Black Hills	281	Fire-Brick	281	New Mexico	282	Sulphide Inter-	
Britain	281	Gold-Quartz Re-		Oklahoma	282	growths	283
Broken Hill	281	placements	282	Ore Persistence	282	Sulphides	283
Butte	281	Igneous Rocks	282	Petroleum	282	Texas	283
Canada	281	Iron Ore	282	Philippines	282	Tonopah	283
Chalcocite	281	Iron Pyrites	282	Phosphorus	282	Utah	283
Clay Slips	281	Iron Ranges	282	Polished Sections	282	Vancouver	283
Colloidal Migra-		Joplin	282	Porcupine	282	Wabana Ore	283
tion	281	Kyshtim	282	Queensland	283	War Geology	283
C o p p e r Indi-		Magmatic Differ-		Rock Gas	283	Warren District	283
cations	281	entiation	282	Secondary En-		Witwatersand	283
		Manganese	282	richment	283		

IRON AND STEEL

Analysis	283	Elastic Limit	285	Manganese	287	Rolling	288
Austria	283	E l e c t r i c F u r-		Menominee	287	Rolling Mills	288
Belgium	284	naces	285	Mesabi	287	St. Louis	289
B e s s m e r P r o -		E l e c t r o m e t a l -		Meteoric Iron	287	S i n t e r i n g	
cess	284	lurgy	285	Methods	287	Plants	289
Blast - Furnace		England	286	Newfoundland	287	Slag-Crushing	289
Gas	284	Erosion in Guns	286	Nickel Ores	287	Slags	289
Blast - Furnace		F e r r o - M a n -		Nickel Steel	287	Sound Ingots	289
Operation	284	ganese	286	Openhearth Steel	287	Specifications	289
Blast - Furnace		France	286	Ore Handling	287	Statistics	289
Practice	284	Future Develop-		Ore-Washing	287	Steel	289
Blast Furnaces	284	ment	286	Oxidation	287	Steel Industry	289
Blowing Engines	285	Gas Burners	286	Pacific Coast	287	Steel Plants	289
B r i t i s h C o l -		Gas Fuel	286	Pearlite	287	Steel Works	289
umbia	285	Gas Washing	286	Philippines	287	Sulphur	290
Canada	285	Germany	286	Pittsburgh	287	Sulphur Effect	290
Chile	285	Heat Treatment	286	Prices	288	Terminology	290
China	285	Ingots	286	Production	288	T i n - P l a t e	
Cold-Rolling	285	Internal Stress	286	Publicity	288	Plants	290
Conservation	285	Iron Concentra-		Pure Iron	288	T i t a n i f e r o u s	
Converters	285	tion	286	Quebec	288	Ores	290
Cuba	285	Iron Ores	286	Rails	288	United States	290
Cuyuna	285	Italy	287	Regulators	288	Washed Metal	290
Dry Blast	285	Malleable Iron	287	Review of 1915	288	Wrought Iron	290

MINE OPERATION

Accidents	290	Air Analysis	290	Arctic	290	Bolivia	290
Accounting	290	Annealing	290	Blasting	290	Cave-Ins	290

MINE OPERATION—(Continued)

Change Houses..290	Grouting292	Mine Water ..294	Shaft Pillars...296
Compressed Air..291	Haulage292	Mining Methods.294	Shafts296
Concentration ..291	Headlights292	Mount Lyell ...294	Shaft Sinking...297
Co-operation ...291	Hoisting292	Nevada295	Shops297
Costs291	Hoisting Rope..293	Nitration295	Shovel ing
Cripple Creek...291	Hydraulic Strip- ping293	Nomenclature ..295	Machines ...297
Dams291	Illumination ..293	Openpit Mining.295	Signaling297
Deep Drilling ..291	Law293	Ore Hopper...295	Stope Surveying.297
Deep Mines.....291	Leadville, Colo..293	Ore Loading...295	Stoping297
Drainage291	Locomotives ...293	Pipe-Lines295	Storage - Battery
Dredge291	M a n g a n e s e	Power Plants...295	Locomotives ..297
Drilling291	Steel293	Prospecting295	Stripping297
E l e c t r i c a l	Mine Cars293	Pumping295	Surveying297
Troubles291	Mine Gases...294	Quarries295	Talc297
Electric Power..291	Mine Hospitals.294	Quarrying295	Telephones297
Electric Shovel..291	Mine Locomo- tives294	Rock Drilling...296	Timber297
Explosions291	Mine Machinery.294	Rock Excavation.296	Timbering297
Explosives291	Mine Maps....294	Roofs296	Tramming297
Excavators292	Mine Signals...294	Safety Lamps..296	Utah298
Fires292	Mine Stable...294	Samples296	Ventilation298
Foremen292	Mine Supplies .294	Sampling296	Warehouses298
Gas Detector ..292	Mine Telephones.294	Santa Gertrudis.296	Wire - Rope
Gases292		Sapphires296	Guides298
Gasoline Locomo- tives292		Scraper Mining.296	

MINES AND DISTRICTS

Alaska298	Chile300	Mineral Deposits.301	South Africa...303
America298	China300	Missouri301	South America..303
A p p a l a c h i a n	Chuquicamata ..300	Montana301	South Dakota...303
Region299	Colorado300	National301	Southern States.303
Argonaut299	Columbia300	Nevada301	Spain303
Arizona299	Cuba300	Newfoundland ..302	Tasmania303
Australasia299	Dutch Guiana...300	New Mexico...302	Transvaal303
Australia299	Eastern States..300	New Zealand...302	Turkey303
Austria - Hung- ary299	Ecuador300	Oatman302	United States ..303
Beaver Lake...299	Ellamar300	Ontario302	Urals303
Bolivia299	Gilpin County..301	Oregon302	Uruguay303
Boulder County.299	Grass Valley...301	Peru302	Utah303
Brazil299	Homestake301	Philippines ...302	Virginia304
B r i t i s h C o l u m -	Hungary301	Poland302	Waihi304
bia299	Idaho301	Porcupine302	Washington ...304
British Guiana.299	Japan301	Quebec302	Western Austra- lia304
Broad Pass....299	Joplin301	Queensland ...302	Willow Creek ..304
Burma300	Lake Superior..301	Rand303	Wisconsin304
California300	Madagascar ..301	Reports303	Witwatersrand .304
Canada300	Manitoba301	Russia303	Yukon304
Central America.300	Malaya301	Saskatchewan ..303	

MINOR MINERALS

Allanite304	Clay305	Graphite306	Platinum307
Aluminum304	Cobalt305	Gypsum306	Platinum Substi- tutes307
Antimony304	Cryolite305	Louisiana306	Potash307
Arsenic305	Diamonds305	Magnesite306	Production308
Asbestos305	D i a t o m a c e o u s	Manganese306	Quicksilver308
Barium305	Earth305	Mica306	Radioactive Sub- stances308
Bauxite305	Emerald305	Molybdenite ..306	Radium308
Bismuth305	Fertilizers305	Molybdenum ...306	Rare Earths ...308
Bitumens305	Feldspar305	Nickel307	Salt308
Cadmium305	Fire Clay.....306	Nickel Ores...307	Sand308
Carnotite305	Fluorspar306	Nitrates307	Selenium308
Chemical Indus- try305	Fuller's Earth .306	Ozokerite307	
	Garnet306	Phosphates ...307	

MINOR MINERALS—(Continued)

Silica	308	Talc	309	Titanium	309	Vanadium	310
Slate	308	Tellurium	309	Tungsten	309	Zinc	310
Soda	308	Tin	309	Uranium	310	Zircon	310
Stone	308						

OIL AND GAS

California	310	Kansas	311	Petroleum Meas- urement	312	Reservoirs	313
Canada	310	Louisiana	311	Petroleum Pro- duction	312	Shale Oil	313
Coal Oil	310	Mexican Oil	311	Petroleum Refin- ing	313	South America	313
Conservation	310	Mississippi	311	Petroleum Re- serves	313	Tennessee	313
Cracking Pro- cess	310	Montana	311	Petroleum Re- sources	313	Texas	313
Crude Oil	310	Natural Gas	311	Petroleum	313	United States	313
Dakota Sand	310	Ohio	312	Philippines	313	Uralsk	314
Deposits	310	Oil Expansion	312	Pipe Lines	313	Valuation	314
Drilling	310	Oil Flow	312	Pumping	313	Washington	314
Fire Fighting	310	Oil Reservoirs	312	Refineries	313	Wastes	314
Fire Hazard	310	Oil Shales	312	Refining	313	Water Protec- tion	314
Fires	310	Oil Wells	312	Tables	313	Weight	314
Gasoline	310	Oklahoma	312	Philippines	313	Wells	314
Hydro - Carbon Oils	311	Petroleum	312	Pipe Lines	313	West Virginia	314
Illinois	311	Petroleum Indus- try	312	Pumping	313	World Produc- tion	314
				Refineries	313	Wyoming	314
				Refining	313		

ORE DRESSING

Arizona	314	Cyanidation	315	M a n g a n e s e Silver	319	Screens	319
Blende	314	Cyanide	315	Milling	319	Slocan	319
Braden	314	Cyaniding	315	Mill Sites	319	Smelters	320
Chlorination	314	Development	315	Molybdenite	319	Smelting	320
Classifier	314	Dust Losses	315	Nevada Mill	319	Stamping	320
Clay	314	E l e c t r o s t a t i c Separation	315	North Star	319	Stamp Mills	320
Coeur d'Alenes	314	Flotation	315	Ore-Sampling	319	Stamps	320
Colloids	314	Furnaces	318	Ore-Treatment	319	Steam Stamps	320
Concentrates	315	Glass Surfaces	319	Precipitation	319	Tin	320
Concentration	315	Grinding	319	Pulp Sampler	319	Tube Mills	320
Copper Mattes	315	Iron Ore	319	Roasting	319	Tungsten	320
Copper Smelt- ing	315	Leaching	319	Sampling Plant	319	Vanadium	320
Cornish Ores	315	Magnetic Sepa- ration	319	San Juan	319	Vanadium Ores	320
Crushing	315			Screening	319	Zinc	320

PLACER MINING

Alaska	321	Dredging	321	Mozambique	321	Seward Penin- sula	321
Arizona	321	Drift Mining	321	Niagara	321	Sluicing	321
Atlin	321	Dry Concentrat- ing	321	Nigeria	321	South Carolina	321
British Colum- bia	321			Prospecting	321	Yukon	321

PRECIOUS MEALLURGY

Africa	321	Cobalt	322	Gold Fields	323	Radium	324
Alabama	321	Complex Ores	322	Idaho	323	Rand	324
Alaska	321	Concentration	322	Manitoba	323	Rare Metals	324
Amador County	321	Cottrell Process	322	Montana	323	Review of 1915	324
Amalgamation	322	Cyanidation	322	Oatman	323	Slime Settling	324
Assaying	322	Cyanide Plants	322	Patio Process	323	Sluicing	324
Batopilas	322	Cyanide Prac- tice	322	Philippines	323	Stamp Mills	324
Bullion Segrega- tion	322	Cyaniding	322	Platinum	323	Urals	324
California	322	Gold	323	Precipitate Refin- ing	323	World's Mines	324

MISCELLANY

Agricola, Georg. 324	Fertilizer 325	Mineral Re- sources 325	Silver 326
A. I. M. E. 324	Gold Production. 325	Minerals 325	Southern States. 326
Alaska 324	Japan 325	Mining 325	Sulphuric Acid. 326
Argall, Philip .. 324	Laboratories ... 325	Mining Laws ... 325	Taxation 326
Arizona 324	Lead and Zinc. 325	Ore Buying..... 325	United States... 326
British Mining. 324	Legislation 325	Pitch 325	U. S. Bureau of Mines 326
Canada 324	Metallography ... 325	Production 325	Works Tramwa's. 326
Conservation ... 324	Metallurgy 325	Reviews of 1915. 325	Zinc 326
Copper 324	Metals in War. 325		

RAILWAY ENGINEERING

CONDUCTING TRANSPORTATION

Accidents 327	Freight Cars ... 328	Signal Main- tenance 330	Train Control... 331
Block Signaling. 327	Impact 328	Signal Protec- tion 330	Train Dispatch- ing 331
Brakes 327	Interlocking ... 328	Signals 330	Train Flagging. 331
British Rail- ways 327	Italy 328	Snow 330	Train Handling. 331
Cab-Signaling .. 327	Lighting 328	Storage Bat- teries 330	Train Heating. 331
Collision 327	Operation 328	Superintendents. 330	Train Lengths. 331
Deraillments ... 327	Phase Meter ... 328	Switching 330	Train Rules ... 331
Efficiency 327	Reclaiming 328	Time Standards. 330	Train Service... 331
Electric Light- ing 327	Signaling Prac- tice 330	Track Circuit... 330	Train Shocks... 331
France 328			Tunnel Opera- tion 331

MOTIVE POWER AND EQUIPMENT

Air Brakes 331	Coal Cars 334	Gondola Cars .. 338	Locomotives ... 340
Air Pumps..... 332	Coal Preparation. 334	Handling Equip- ment 338	Locomotive Testing 342
Anti - Collision Coach 332	Commercial Vehicles 334	Headlights 338	Locomotive Tires 342
Armored Cars. 332	Compounding ... 334	Hospital Train. 338	Lubrication 342
Bath Train..... 332	Condensers 334	Impact 338	Materials 342
Bearing Metals. 332	Control 334	Indicator Dia- grams 338	M. C. B. Rules. 342
Boiler Cleaning. 332	Counterbalanc- ing 334	Industrial Loco- motives 338	Motor Cars 342
Boiler Efficiency. 332	Couplers 334	Injectors 338	Motor Vehicles. 342
Boiler Inspec- tion 332	Cranes 334	Inspection 338	Moving - Picture Car 342
Boiler Washing. 332	Dining Cars... 334	Instruction Cars. 338	Oil-Fired Loco- motives 342
Boiler Water... 332	Draft Gear.... 334	Internal - Com- bustion Loco- motives 338	Oil Fuel 342
Box Cars..... 332	Driving Axles. 334	Locomotive Boilers 338	Passenger Cars. 342
Brakes 332	Dynamometer Cars 334	Locomotive Construction. 338	Pneumatic De- vices 342
Brake Shoes... 332	Electrical Equip- ment 334	Locomotive Cranes 338	P. S. Brake... 343
Braking 332	Electric Locomo- tives 334	Locomotive Design 338	Pulverized Fuel. 343
Caboose 333	Electric Rolling Stock 335	Locomotive Economy 339	Rack Railways. 343
Calibration Charts 333	Electrification .. 335	Locomotive Equipment ... 339	Rail Contacts. 343
Car Construc- tion 333	Engine Failures. 336	Locomotive Inspection ... 340	Refrigerator Cars 343
Car Department. 333	Engine Houses. 337	Locomotive Operation ... 340	Repairs 343
Car Dumpers... 333	Exhausts 337	Locomotive Performance. 340	Reversing Gears. 343
Car Heating... 333	Express Cars ... 337	Locomotive Repairs 340	Review of 1915. 343
Car Inspection. 333	Feed Water ... 337		Sanitation 343
Car Lighting... 333	Fireboxes 337		Scrap 343
Car Main- tenance 333	Flat Wheels... 337		Scrap Handling. 343
Car Materials. 333	Freight Cars... 337		Scrap Reclama- tion 343
Car Painting... 333	Fuel 337		Shop Practice. 343
Car Radiators. 333	Fuel Consump- tion 337		Shops 343
Car Repairs... 333	Fuel Economy... 337		Smoke Abate- ment 343
Cars 333	Fuel Inspectors. 337		
Car Shops 333			
Car Wheels ... 333			

MOTIVE POWER AND EQUIPMENT—(Continued)

Smoke Preven- tion343	Storekeeping ...344	Test Cars344	Trucks345
Standards343	Stress Analysis.344	Tinware344	Valve Gears....345
Steam Shovels..344	Superheaters ...344	Tires344	Water Service..345
Steel Cars.....344	Superheating ..344	Train Lighting.344	Water Waste ..345
Stokers344	Terminals344	Trains345	Wheels345

PERMANENT WAY AND BUILDINGS

Ballast345	Electric Light- ing347	Re-alignment ...349	Track351
Ballasting345	Embankments ..347	Reinforced Con- crete349	Track Acces- sories351
Ballast Plough..345	Encroachments .347	Roadway349	Track Eleva- tion351
Buildings345	Engine Houses .347	Rock Cuts349	Track Inspec- tion351
Car-Repair Shed.345	Fence Posts347	Roundhouse349	Track Mainte- nance351
China345	Freight Stations.347	Scales349	Track Mate- rials351
Clearance345	Fuel Stations...347	Scrap349	Track Resist- ance352
Coaling Stations.345	Grade Crossings.347	Shops349	Track Scales...352
Coal Stage.....346	Impact348	Side - Hill Con- struction ...349	Track Tools...352
Coal Storage...346	Junctions348	Sidings349	Train Sheds...352
Concrete346	Landscape Gard- ening348	Snow Sheds349	Tunnels352
Concrete Track Footings346	Location348	Standardization.350	Tunnel Ventila- tion352
Concrete Work..346	Locomotive Works348	Stations350	Turntable352
Construction ..346	Masonry348	Structures350	Water352
Contract Forms.346	Materials348	Subways350	Water Tanks...352
Convention346	Mexico348	Swamps350	Widening352
Crossings346	Rack Railroad..348	Syria350	Yards352
Curves346	Rail Breaking..348	Tanks350	
Cutoff346	Rail Failures..348	Terminals350	
Detroit Tunnel..346	Rail Joints....348	Ties351	
Drainage346	Rails348	Tie - Treating Plant351	
Drawbridges ...346	Rail Stress ...349		
Efficiency346			
Electricity347			

ROADS AND PROJECTS

Africa352	Chesapeake & Ohio N.353	Italy354	New York Cen- tral354
Asia Minor352	China353	Japan354	New York City.354
Bagdad Ry.....352	Coal Roads353	Lackawanna ...354	N. Y. Connect- ing R. R.354
Baltimore & Ohio353	Colombia353	Material Yards.354	Norfolk & West- ern355
Belgium353	Cuba353	Mersey Ry354	Paducah & Illinois355
Brazil353	England353	Mexican Rail- way354	Rock Island ...355
Burlington353	Eskdale353	Mexico354	Russia355
Canada353	France353	Mount Washing- ton354	Scotland355
Canadian Northern353	Furka Line....353	New England ..354	Tunnel355
Canadian Pacific353	Great Western Ry.353	New Haven354	United States .355
Ceylon353	Greenock353	New South Wales354	Wales355
Chesapeake & Ohio353	Holland354		
	Hudson Bay...354		
	India354		

TRAFFIC

Car Inspectors..355	Freight355	Mail Service ...356	Tie Cars.....356
Car Loading ..355	Freight Conges- tion355	M. C. B. Rules..356	Tonnage Rating.356
Car Pooling....355	Freight Handl- ing356	Operating Costs.356	Trade356
Chicago355	Fruit Cars.....356	Pooling356	Train Loading..356
Claims355	Immigration Service356	Rates356	Train Resist- ance356
Clearing House.355	Loading356	Refrigerator Cars356	War Operation..356
Commerce355		Single Track...356	Women Em- ployees357
Erie355		Snow Handling.356	
Europe355			
France355			

MISCELLANY

American Railways	357	M a i l Regu- tions	357	R. R. Superin- tendents	357	Records	358
Blacksmiths ...	357	Military	357	Railway Econ- omics	357	Relations	358
British Rail- ways	357	N a t i o n a l Defense	357	Railway Mate- rials	357	Review of 1915..	358
Central Amer- ica	357	Parcel Post....	357	Railway Prob- lems	357	Scrap	358
Co-operation ..	357	Preparedness ..	357	Railway Service.	358	Standards	358
Fuel Depart- ment	357	Radial Railways.	357	Railway Situa- tion	358	Statistics	358
G o v e r n m e n t Ownership ...	357	Railroad Char- acteristics	357			Storekeepers ..	358
						Supply Depart- ment	358
						Testing	358

STREET AND ELECTRIC RAILWAYS

Accident Prevention	359	Electrolysis	361	One-Man Cars	362	Schedules	364
Articulated Car	359	Elevated Roads	361	Ontario	362	Shop Practice	364
Boston Elevated	359	Escalators	361	Overhead Construction	362	Shops	364
Braking	359	Fares	361	Paris	362	Signaling	364
Cable Railway	359	Franchises	361	Parlor Cars	363	Signals	364
Car Bodies	359	Freight Traffic	361	Portland, Ore.	363	Skip Stops	364
Car Control	359	High Tension	361	Power	363	Snow	364
Car Equipment	359	Inspection	361	Power Distribution	363	Stations	364
Carhouses	309	Installations	361	Power Economics	363	Steel Cars	364
Car Lighting	309	Interurban	361	Power Load	363	Stops	364
Car Maintenance	359	Interurban Terminal	361	Power Plants	363	Storage Battery Cars	365
Car Materials	359	Iowa	361	Power Sales	363	Substations	365
Car Operations	359	Jitneys	361	Power Saving	363	Subways	365
Cars	359	Lightning Arresters	361	Power System	363	Subway Ventilation	365
Car Trucks	360	Load Dispatching	362	Problems	363	Supply Manufacture	365
Car Ventilation	360	London	362	Public Relations	363	Switches	365
Car Wiring	360	Los Angeles	362	Rail Bonding	363	Terminals	365
Chicago Traffic	360	Lubrication	362	Rail Joints	363	Three - Wire System	365
City Traffic	360	Maintenance	362	Railless	363	Track Foundation	365
Cleveland	360	Main Tenance Trucks	362	Rails	363	Track Maintenance	365
Competition	360	Motors	362	Rates	363	Track Paving	365
Contact Systems	360	Newark Traffic	362	Receipts	364	Tracks	365
Controllers	360	New South Wales	362	Remodeling	364	Traffic	366
Current	360	N. Y. Dual System	362	Resistors	364	Train Control	366
Current - Leakage	360	N. Y. Subways	362	Return Feeders	364	Trolley Wire	366
D. C. Equipment	360			Review of 1915	364	Utah	366
Development	360			Rolling Stock	364		
Electric Traction	360			Safeguards	364		
				Safety Devices	364		



THE ENGINEERING INDEX

1916

CIVIL ENGINEERING

BRIDGES	25	MUNICIPAL	63
CONSTRUCTION	33	ROADS AND PAVEMENTS	72
IRRIGATION AND RECLAMATION ...	45	WATER SUPPLY	83
MATERIALS OF CONSTRUCTION ...	47	WATERWAYS AND HARBORS	97
MEASUREMENT	54	MISCELLANEOUS	105

Approaches

Approaches

Making the Earthwork Approach to Columbia River Bridge (67581). E. E. Howard. Ills. 3000 w. E N—Jan. 27, 1916. Heavy hydraulic fill at Portland, Ore.

Arch

Erection of Old Trails Bridge Over Colorado River (70766). J. A. Sourwine. Ills. 2800 w. E N—June 1, 1916. Steel arch of 592 ft. Novel Method.

The Analysis of the Continuous Arch by the Elastic Method (71866 A). Horace R. Thayer. Ills. 23 pp. E C B, JI—July, 1916. Limited to the concrete arch.

Pennsylvania Railroad Bridge at Phoenixville (71098). Ills. 1200 w. R A G—June 16, 1916. Arch structure and construction plant.

Beitrag zur Bestimmung der Bogenform bei Wölbbbrücken (65415 B). R. Doorentz. Ills. 2000 w. B u E—Oct. 4, 1915. Formulas for reinforced-concrete arches in bridges.

Australia

Longest Timber Span Bridge in Australia (73895 N). Ills. 1800 w. Cw E—Sept., 1916. Construction details.

Baltimore

Steel Cantilever Ribs Balanced Over Main Piers to Form Arched Concrete Spans (70487). Ills. 1500 w. E R—May 20, 1916. Hanover St. bridge, Baltimore. Designed to avoid use of falsework.

Well-Balanced Mixing Plants Pour Dense Concrete from High Towers on Long Highway Bridge (70373). Ills.

BRIDGES

Bridgeport, Conn.

2500 w. E R—May 13, 1916. Serial, 1st part. In Baltimore.

Baltimore's New Bridge (70051). Ills. 800 w. M Rd—May 4, 1916. Progress on bridge across the Patapsco.

Bascule

Bascule Bridges over the Lake Washington Canal (68829 N). Frank Arthur Rapp. 10 pp. P N S E, Pro—Dec., 1915. Brief description of design.

Double-Deck Bascule Bridge Over Chicago River (65539). Hugh E. Young. Ills. 2700 w. Eng News—Nov. 4, 1915. Heavy double-leaf structure on Lake St.

Substructure of the Lake St. Bascule Bridge at Chicago (65689). Hugh E. Young. Ills. 2500 w. Eng News—Nov. 11, 1915. Foundations.

Design and Construction of the Substructure for a Three-Track Trunnion Bascule Bridge in Chicago, Ill. (68288). Ills. 1500 w. E & C—Feb. 23, 1916.

Bascule Bridge of Short Span. Near Detroit (68008). Ills. 1500 w. E N—Feb. 10, 1916.

Shallow Railway Floor on Canal Bascule Bridge (73386). Arthur G. Hayden. Ills. 1200 w. E N—Sept. 21, 1916. Combined railway and highway bridge at Syracuse, N. Y.

New Three Track Bascule Bridge at Chicago (72440). Ills. 2000 w. R A G—Aug. 11, 1916. Three-track Strauss bascule of the heel trunnion type.

Bridgeport, Conn.

Design of the New Stratford Avenue Bridge, Bridgeport, Conn. (72638 N). W.

Consult Classification of the Index. See page 7.

Building Code

Watters Pagon with discussion. Ills. 3000 w. Conn Soc Civ Engrs—1916. Detailed description.

Building Code

Calcul et épreuves des ponts métalliques (65462 B). A. Goupil. Ills. 4000 w. Gen Civ—Oct. 23, 1915. New French regulations for design and testing of steel bridges.

Caissons

Building Concrete Caissons in the Platte River. (66298 A) J. H. Merriam. Ills. 2500 w. R G—Dec. 17, 1915. Bridge building near Ashland, Neb.

Cantilever

Plate - Girder Cantilever Bridge (72423). Arthur G. Hayden. Ills. 900 w. E N—Aug. 10, 1916. Steel bridge of novel type at Salamanca, N. Y.

Causeway

Corpus Christi Causeway Contains 2300 Feet of Reinforced-Concrete Girder Spans (68986). Terrell Bartlett. Ills. 2000 w. E R—March 18, 1916. Oyster shell fill for approaches.

Centering

Erection of an Arch on Suspended Centering of Reinforced-Concrete (68455 A). Ills. 800 w. Enr—Feb. 11, 1916. In Travancore, India.

Charing Cross

Charing Cross Bridge (71842 A). Ills. 1200 w. Enr—June 30, 1916. Serial, 1st part. Proposed alterations for strengthening and beautifying the structure.

See also Concrete Arch, under *Bridges*; and Arch Design, under *Measurement*.

Chicago

Chicago Track-Elevation Bridges of Illinois Central R. R. (69211). Ills. 3000 w. E N—March 30, 1916. Design and construction of two types.

Cleveland

Steel Spans and Concrete Arches Combined to Form Unusual Bridge at Nineteenth Street, Cleveland (72461). Ills. 1500 w. E R—Aug. 12, 1916. Design and requirements.

Collapse

Rusted Pony Truss Collapses at Johnstown, Penn. (69213). Ills. 1200 w. E N—March 30, 1916. Causes of failure.

Concrete

Zwei neue Eisenbetonbrücken über die Pegnitz. (66205 B). Hermann Goebel. Ills. 1500 w. B u E—Nov. 3, 1915. Reinforced-concrete bridges over Pegnitz.

Construction of Washington St. Arch Bridge at Indianapolis (66357). Ills. 2200 w. E. N—Dec. 9, 1915.

A 2223-Ft. Concrete-Arch Bridge Built on Reverse Curve (66834). A. M. Richter. Ills. 4300 w. E N—Dec. 30, 1915. Third Ave. bridge across Mississippi at Minneapolis.

BRIDGES**Concrete**

Lemieux Island Bridge, Ottawa (66784). L. McLaren Hunter. Ills. 800 w. Cn E—Dec. 23, 1915. Four-span reinforced concrete arch.

Design of a 242-Ft. Arch Span Over the Pit River in Shasta County, California (66498). Ills. 1500 w. E & C—Dec. 15, 1915. Reinforced concrete highway structure.

Little Plant Required to Complete 4000-Foot Concrete Railroad Bridge (73251). Ills. 2500 w. E R—Sept. 16, 1916. Two-track arch structure built under traffic.

Design and Construction of a Reinforced Concrete Truss Bridge with Braced Counterfort. Abutments Near Merthyr, Wales (65823). Ills. Charles E. Holloway. 2000 w. Engng & Con—Nov. 17, 1915. Details.

Olympic Bridge, Island Park, Toronto (65998). E. M. Proctor. Ills. 900 w. Can Engr—Nov. 25, 1915. Artistic reinforced concrete arch.

Simple Type of Concrete Bridge for Grade Crossings (68522). C. W. Martin. Ills. 1600 w. E N—March 2, 1916. In St. Louis.

Die Waldeckbrücke bei Burgdorf (68853 B). M. Schnyder. Ills. 1200 w. S B—Feb. 26, 1916. Flat arch bridge for highway.

Q Street Bridge at Washington (66994). Ills. 1400 w. E N—Jan. 6, 1916. Ornamental concrete arch.

Les ponts de Montauban (67779 B). Charles Rabut. Ills. 2200 w. Gn Cv—Jan. 29, 1916. Old masonry bridge of city of Montauban and new reinforced concrete-arch structures.

Architectural Effects Secured in Glens Falls Arch Bridge Over Hudson River (65570). Ills. 1200 w. Eng Rec—Nov. 6, 1915. Features of a reinforced-concrete arch of striking appearance.

Experience and Costs in Making Concrete-Bridge Units (70054). Horace M. Holmes. Ills. 1900 w. E N—May 4, 1916. Members for Yolo bypass in California.

How a Concrete Arch Is Being Built Under a Steel Bridge (70432). Daniel J. Hauer. Ills. 1800 w. Cnr—May 15, 1916. Unfavorable conditions and how overcome.

Alexandra Bridge, Pietermaritzburg (72151 A). Ills. 800 w. S M C E—July 14, 1916. Cantilever principle in reinforced construction.

Norfolk's Ferro-Concrete Bridges (71153 A). Ills. 1500 w. S M C E—June 2, 1916. English types.

See also Viaducts, under *Bridges*.

Bensalem Avenue Concrete Arch Bridge, Philadelphia, Pa (72040). Jonathan Jones. Ills. 1800 w. E & C—July 26, 1916. Details of design.

Concrete

Pitt River Reinforced-Concrete Arch in California (71503). Ills. 700 w. E N—June 29, 1916. Details of design.

The Economical Section for Short Span, Reinforced Arches Carrying Light Highway Loadings (72041). Ills. 1500 w. E & C—July 26, 1916. Comparison of two arch rings illustrating facts which determine shape and size.

Design and Construction of a Through-Arch Reinforced Concrete Bridge at Kristianstad, Sweden, with Comparative Data on the Design of the Lyons Falls Bridge in New York (70455). Albert M Wolf. Ills. 2000 w. E & C—May 17, 1916. Based on translation from *Beton u. Eisen*.

Arroyo Seco Reinforced Concrete Bridge Near Pasadena, Cal. (70381). Charles Alma Byers. Ills. 2000 w. Crt—May, 1916. Design, form work, etc.

The Cherry Street Bridge, Toledo, Ohio (66727 D). 2000 w. A S C E—Dec., 1915. Discussion of paper by Clement E. Chase, Jun.

Replacing Water-Main Bridge with Concrete Arch (66545). Ills. 800 w. E N—Dec. 16, 1915. Aqueduct in city of Washington built about 1852 now being inclosed in reinforced concrete arch bridge.

Design of the Massachusetts Street Bridge Over the Kansas River at Lawrence, Kansas (67222). Ills. 2500 w. E & C—Jan. 12, 1916. Reinforced concrete arch under construction.

Design and Construction of a High-Level Reinforced Concrete Highway Bridge Across the Skurusund in Sweden (69470). Based on an article by George Brockner. Ills. 1200 w. E & C—April 12, 1916. Details of structure near Stockholm.

Reinforced Concrete Bridges (68068 D). Ills. 17500 w. Am Ry Bldg & Bldg Assn—Oct., 1915. Committee report.

The Artistic Design of Concrete Bridges (68114 B). William J. Titus. Ills. 3000 w. Ind Eng Soc—1915. Necessary qualifications and special features.

Eine Eisenbetonbogenbrücke in Kristianstad (Schweden) (67711 B). David Anderson. Ills. 1000 w. B u E—Jan. 4, 1916. Reinforced concrete arch bridge across railway tracks in Christiania.

Design of a Curved Chord Reinforced Concrete Highway Bridge at Lyons Falls, N. Y. (68144). Ills. 600 w. E & C—Feb. 16, 1916. Unusual design.

The Construction of Culverts and Short Span Bridges (69466 A). E. K. Borchart, with discussion. 2500 w. C C E—March, 1916. General considerations and points in design.

Calgary's Center Street Bridge

BRIDGES

Elevated Railroad

(69821). W. E. Hardenburg. Ills. 1500 w. Mun J1—April 20, 1916. Two-deck, ten-arch spans.

The Concrete Bridges and Viaducts of Cincinnati, Ohio (68936). Frank L. Raschig. Ills. 1500 w. E & C—March 15, 1916. Extracts taken from a paper read before the Convention of the American Concrete Institute in Chicago.

Construction

Handling Practical Bridge Construction Work (69782). Ills. 2500 w. R A G—April 21, 1916. Five methods of solving special problems.

Culverts

Reinforced-Concrete Pipe Used for Railway Culverts (73584). Ills. 1700 w. E N—Sept. 28, 1916. Details.

Design

Unusual Bridge Designs (68828 N). Charles Evan & Fowler. Ills. 10 pp. P N S E, Pro—Dec., 1915. Determining factors.

Mission Bridge in Canadian Northwest Designed as Adornment to Its Location (72466). John F. Greene. Ills. 1200 w. E R—Aug. 12, 1916. Special features of design.

Street Bridges in Philadelphia Designed for Permanent Artistic Effects (65722). Ills. 2000 w. Eng Rec—Nov. 13, 1915. Steel protected by concrete with effective surface treatment.

Report of the Bridge Committee (68115 B). 3500 w. Ind Eng Soc—1915. Designs and specifications; discussion.

Design of Bensalem Avenue Bridge Governed by Architectural Requirements of Site (74058). Jonathan Jones. Ills. 1800 w. E R—Oct. 21, 1916. Important arch structure in Philadelphia.

Drawbridge Mechanism

The Operating Machinery of the Willamette River Drawbridge, Near Portland, Oregon (73879 B). Byron B. Carter, with discussion. Ills. 35 pp. W S E, J1—Sept., 1916. Results of an examination after six years' service.

Drawbridges

New Form of End Lift Used on Chelsea North Draw (71505). Randall D. Gardner. Ills. 900 w. E N—June 29, 1916. Detail of new drawbridge, Boston.

Combined Railway and Highway Scherzer Rolling-Lift Bridge (71727 A). Ills. 2000 w. Eng—June 2, 1916. Great Central Ry. bridge over an English river.

Keadby Bridge Great Central Railway (72154 A). Ills. 500 w. R G—July 14, 1916. Five spans across the river Trent. Electrically operated Scherzer rolling-lift.

Elevated Railroad

Full-Load Secondary Stresses in Elevated-Railway Bents (65690). L. R.

Consult Classification of the Index. See page 7.

Erection

Manville. Ills. 2200 w. Eng News—Nov. 11, 1915. Dangerous stresses and means of reducing them.

Erection

Special Steel and Timber Erection Tower Places Heavy Plate Girders (68702). Ills. 1000 w. E R—March 11, 1916. Nickel Plate bridge in Chicago.

Piecemeal Erection of a Bridge on the Boston & Maine R. R. (66138). K. W. Lemcke. Ills. 1600 w. E N—Dec. 2, 1915. New trusses on old piers; two-story falsework.

Falsework

Difficult Falsework Erection for 242-ft. Concrete Arch (67260). Ills. 700 w. E N—Jan. 13, 1916. Use of a Howe truss of round logs to carry centering.

Floors

Broken Track Stringers in Bascule Bridge Lead to Proposed New Floor Design (66917). F. H. Avery. Ills. 1800 w. E R—Jan. 1, 1916.

Highway Bridge Floors (70273 B). Charles M. Spofford, with discussion. Ills. 100 pp. E S W P, Pro—Dec., 1915. Loads, width, wearing surfaces, supports, distribution of loads.

Queensboro Bridge Floor Strengthened by Adding Stiffness to Buckle Plates (70484). Ills. 1000 w. E R—May 20, 1916. New 3-inch block flooring with thicker concrete.

Solid Floors for Through Girder Span (72064). Ills. 1200 w. R A G—July 28, 1916. Reinforced concrete floor.

Pressed Steel Floor Forms Left in Place on Two-Mile Bridge Eliminate Carpenters (70963). Ills. 2500 w. E R—June 10, 1916. Methods used on St. Louis municipal bridge.

Foundations

Placing the Foundations for a Bridge at Watertown, Mass. (70801 A). Daniel J. Hauer. Ills. 2500 w. Cnr—June 1, 1916. Details and suggestions.

Foundations for Dayton Bridge Finished in Four Months Despite Four Floods (69829). Ills. 1200 w. E R—April 22, 1916. Methods.

Foundation Work on the Metropolis Bridge (73056). Ills. 2000 w. R A G—Sept. 8, 1916. Interesting caisson details used for Ohio River bridge.

Girder

Girder Bridge Replaces Truss over Fast Express Tracks (68983). Ills. 2000 w. E R—March 18, 1916. Pennsylvania R. R., near Langhorne, Pa.

Hell Gate

Die Hell-Gate-Brücke über den East River in New York (65422 B). O. H. Ammann. Ills. 1800 w. Schw Bau—Oct. 16, 1915. General description.

BRIDGES**Lift**

Erection of the Hell Gate Bridge (66467). Walter J. Parsons. Ills. 3000 w. Wis E—Dec., 1915.

Hell Gate Bridge, New York (66331 A). Ills. and Plate. 3000 w. Enr—Nov. 26, 1915.

The Erection of the Hell Gate Arch (66647 A). C. S. Whitney. Ills. 2500 w. C C E—Dec., 1915.

Highway

Some data on Waterway Areas Required for Highway Bridges (66499). W. S. Gearhart. Abstract of paper before the Pan-American Road Cong. 1500 w. E & C—Dec. 15, 1915. Approximate determination.

Concerning the Use of Steel Highway Bridges in Iowa (66822). J. H. Ames. Ills. 2000 w. E & C—Dec. 29, 1915. Conditions affecting design, life, etc.

Highway Bridge Development in Ontario (70094). George Hogarth. Ills. 2500 w. Cn E—May 4, 1916. Types.

Some Minor Problems in a Highway Bridge Design (68153 B). L. M. Hastings. Ills. 1000 w. B S C E, JI—Feb., 1916. Bridge at Cambridge, Mass.

Strassenbrücke über die Sihl bei Scheeren (72121). Fritz Locher. Ills. 2000 w. S B—July 1, 1916. Highway bridge over the Siehl River near Scheeren.

The Construction of Highway Bridges (72435). Lucius E. Allen. 2500 w. Cn E—Aug. 10, 1916. Practical points regarding selection of type and manner of construction.

Impact

Impact Formulas for Highway Bridge Design (69360). E. H. Darling. 2500 w. Cn E—April 6, 1916. Serial, 1st part. Two railway formulas unsuited for highway bridges.

Iron Depreciation

Condition of Iron in the Old Keokuk Bridge (72932). George C. Hinckley. Ills. 2800 w. E N—Aug. 31, 1916. A study in depreciation and absolescence. Condition of 45-yr.-old iron bridge.

K-Truss

K-Truss Bridge of Santa Fe Across Arkansas River (71944). Ills. 900 w. E N—July 20, 1916. New structure at Pueblo, Colo.

Lawrence, Mass.

Central Bridge at Lawrence Is Built from Four Separate Mixing Plants (73625). E. K. Cortright. Ills. 2000 w. E R—Sept. 30, 1916. Construction trestle used over shallow Merrimac River. Three caissons for one bascule pier.

Lift

Pine Bluff Vertical-Lift Span Suspended by Chains (68520). Ills. 1800 w.

Consult Classification of the Index. See page 7.

Maintenance

E N—March 2, 1916. Chains in place of wire ropes. Arkansas River.

A Bridge Over the Arkansas River Near Pine Bluff (67266). Ills. 1500 w. R A G—Jan. 14, 1916. Combination railroad and highway structure with lift span.

Lift Spans Over Arkansas River Designed for Possible Shifting of Channel (66010). Ills. 3300 w. Eng Rec—Nov. 27, 1915. Unusual lifting mechanism used in bridge near Pine Bluff, Ark.

Design and Construction of the Sub-structure of the Buffalo River Lift Bridge, Buffalo, N. Y. (65645). Ills. 2500 w. Engng & Con—Nov. 10, 1915. Difficult construction of piers for lift span.

Maintenance

Painting and Maintaining Steel Highway Bridges (69753). George Hogarth. Extracts from paper before Ontario conference. 2000 w. E & C—April 19, 1916. Methods.

Painting and Maintaining Steel Highway Bridges (68208). George Hogarth. 3500 w. Cn E—Feb. 17, 1916. Abstract of paper at Toronto Conference. Suggestions.

Masonry

Alcune considerazioni sui ponti in muratura (67748 B). C. I. Azimonti. Ills. 26 pp. C I A At—Dec. 25, 1915. Best practice in design and construction of masonry and concrete bridges.

Manhattan

Plaza Improvements of the Manhattan Bridge, New York City (70492 A). C. N. Pinco. Ills. 3500 w. C C E—May, 1916. Details of treatment.

Memphis

New Mississippi River Bridge at Memphis (73868). Ills. 2500 w. R A G—Oct. 13, 1916. Mayari steel used. High water interfered with erection.

Military

Les Ponts Militaires (73509 B). A. B. Des Chaumes. Ills. 2800 w. Gn Co—Aug. 19, 1916. Portable and temporary steel bridges for military purposes.

I ponti militari (66276 B). Cesare Chiodi. Ill. 5000 w. M T—Nov. 20, 1915. Serial, 1st part. Methods of construction of all types of bridges used in war.

Ohio River

A New Ohio River Bridge at Metropolis (70336). Ills. 1700 w. R A G—May 12, 1916. Design and construction.

Ottawa

Billings Bridge Over Rideau River, Ottawa, Ont., Canada (70837 N). L. McLaren Hunter. Ills. 1200 w. I M C E,

BRIDGES**Quebec**

Jl—May, 1916. Steel bridge to replace wooden structure.

Overflow Bridges

Overflow Bridges—Types of Overflow Bridges Used in McLennan County, Texas (72644). William C. Davidson. Ills. 2500 w. E & C—Aug. 23, 1916. Details of bridges built in the years 1914 and '15.

Piers

Foundation Types for Piers (70247 A). Charles Evan Fowler. Ills. 1300 w. W E—May, 1916. Types in use and their cost.

Methods and Cost of Constructing a Small Bridge Pier in the Potomac River (70599). Elliott Vandevanter. Ills. 3000 w. E & C—May 25, 1916.

Caisson-Sinking and Pier Construction at Southwark Bridge (67335 A). Ills. & Plate. 1200 w. Eng—Dec. 31, 1915. Details of work in constructing one of the river piers.

Plate Girders

Record-Breaking Plate Girders for Nickel Plate R. R. (66350). Ills. 1200 w. E N—Dec. 9, 1915. Grade crossing work at Chicago.

Strachan Avenue Bridge, Toronto (69226). E. M. Proctor. Ills. 1200 w. Cn E—March 30, 1916. Floor system presents new features.

Pontoon

Military Pontoon Bridges Used in the United States Army (72059). Percy E. Barbour. Ills. 1200 w. E N—July 27, 1916. Standard forms.

Pontoon

Design of a Railway Pontoon Bridge (69761 B). H. J. Hansen. 12 plates & Ills. 25 pp. W S E, Jl—Jan., 1916. Design and construction; at Prairie du Chien, Wis. With discussion.

Portland, Me.

Construction Details of Bridge Across Portland Harbor (65536). Ills. 2500 w. Eng News—Nov. 4, 1915. Concreting methods; foundation work.

Progress

Monumental Bridges (72604 B). Gustav Lindenthal. Ills. 11 pp. C E S, Jl—July, 1916. A review of progress in design and construction.

Quebec

I. Breakage of Casting of Rocker-Joint Bearing Responsible for Quebec Bridge Disaster. II. Revolutionary Methods Used to Float and Hoist Center Span of Quebec Bridge (73441). Ills. 5500 w. E R—Sept. 23, 1916. Cause of failure.

What Lesson Does the Second Quebec Bridge Disaster Teach? (73554). 1200 w. E & C—Sept. 27, 1916. Editorial on dan-

Quebec

BRIDGES

Railway Bridges

ger of applying test data beyond limits of actual tests.

Progress of Erection of the New Quebec Bridge (65670 A). Ills. & Plate. 1200 w. Engr. Lond—Oct. 29, 1915. Erection since April.

Erection of Quebec Bridge Suspended Span (73205). A. J. Meyers. Ills. 3000 w. E N—Sept. 14, 1916. Details of method followed and the failure.

Quebec Bridge Central Span (73314). Ills. With short editorial. 1800 w. Cn E—Sept. 14, 1916. Circular issued to engineers explaining arrangements for placing span.

Quebec Bridge Disaster (73432). Ills. 2500 w. Cn E—Sept. 21, 1916. History of structure; incidents leading to collapse.

Quebec Bridge Disaster Charged to Casting (73349 A). Ills. 1200 w. I A—Sept. 21, 1916. One of the four cast-steel bearings believed to have collapsed.

Quebec Suspended-Span Hoisting Details Completed (72933). A. J. Meyers. Ills. 4000 w. E N—Aug. 31, 1916. Outline of plan for placing this span.

Suspended Span of New Quebec Bridge Falls Into River While Being Hoisted Last Monday Morning (73257). Also editorial. Ills. 4500 w. E R—Sept. 16, 1916. Account of failure and suspected cause.

The Cause of the Quebec Bridge Disaster (73389). Ills. 4000 w. R A G—Sept. 22, 1916. Failure of bearing.

The Erection of the Suspended Span New Quebec Bridge (73556). G. V. Davies and N. C. McMath. Ills. 700 w. E & C—Sept. 27, 1916. Details of plans.

The Full Evidence on the Fall of the Quebec Bridge Span (73388). Ills. & Plate. Also editorial. 3500 w. E N—Sept. 21, 1916. Investigation of the structural conditions preceding the fall.

Pertinent Remarks on the Quebec Bridge Accident (73889 A). William P. Parker. 1800 w. E C P, Pro—Oct., 1916. A study of the cause of failure.

The Fall of the Quebec Bridge Suspended Span (73946). Ills. Also two editorials. 4000 w. Cnt—Oct., 1916. Description and cause of accident.

What Was the Cause of the Initial Failure at the Quebec Bridge? (73788). Ills. 2500 w. E R—Oct. 7, 1916. Computations and specifications for steel rocker casting. Also editorial.

Computing the Stresses in the Quebec Rocker Casting (73721). Also editorial. Ills. 5500 w. E N—Oct. 5, 1916. An analysis of the detail that failed.

Quebec Bridge Erection, Progress in 1915 (66997). H. P. Borden. Ills. 1500

w. E N—Jan. 6, 1916. Completion of north cantilever and entire south anchor arm.

South Cantilever Arm of Quebec Bridge Completed (72513). A. J. Meyers. Ills. 4700 w. Also editorial. E N—Aug. 17, 1916. 13000 tons of steel erected in 92 days. Erection methods.

South Cantilever Arm, Quebec Bridge (72549). A. J. Meyers. Ills. 1800 w. Cn E—Aug. 17, 1916. Details of progress during the present season.

The New Quebec Bridge (70783). A. J. Meyers. Ills. 1200 w. Cn E—June 1, 1916. Details of method for hoisting the suspended span in place.

L'état travaux du pont de Québec sur le Saint-Laurent, Canada (71328 B). P. Calfas. Ills. 3000 w. Gn Cr—June 3, 1916. Construction progress on the Quebec bridge.

The Erection of the New Quebec Bridge (70490 A). N. C. McMath. Ills. 4000 w. C C E—May, 1916. Methods used in this work.

The Season's Work on the Quebec Bridge (70628). A. J. Meyers. Ills. 1200 w. R A G—May 26, 1916. Programme for completion of structure during 1916.

Progress on the Erection of the New Quebec Bridge (66760). H. P. Borden. Ills. 700 w. R A G—Dec. 24, 1915.

The Erection Plant for the Quebec Bridge (66805 A). Ills. 2000 w. Eln—Dec. 17, 1915. Serial, 1st part. Particularly crane equipment used.

Erection of the Quebec Bridge (71701). Ills. 3500 w. Cnt—July, 1916. Serial, 1st part. Methods and plant.

The Erection of Quebec Bridge—Programme for Season 1916 (71643 A). Ills. 1500 w. Enr—June 16, 1916. Work to be carried during present season.

Railroad Bridges

The Proposed Thames River Railroad Bridge at New London, Conn. (72637 N). P. B. Spencer, with discussion. 2500 w. Conn Soc Civ Engrs—1916. General information.

New Railway Bridge Over Ohio at Metropolis, Ill (72058). Ills. 1800 w. E N—July 27, 1916.

Wheel-Load and Impact Charts for Railway Bridges (71266). D. B. Steinman. Ills. 1500 w. E N—June 22, 1916.

Design of Timber Railway Bridges in Queensland (66316 N). W. J. Doak. Ills. 3000 w. Cw. E—Nov., 1915. Data of successful spans in use.

Consult Classification of the Index. See page 7.

Raising

Solid Deck Trestles and Bridges on the Illinois Central (66638 A). Ills. 700 w. R G—Dec. 3, 1915. Details of reinforced concrete trestles.

Hampton Court Junction Fly-over Line and Bridge, London & South-Western Railway (65913 A). Ills. 300 w. Ry Gaz, Lond—Nov. 12, 1915. Details of bridge.

A New Bridge for the Bessemer & Lake Erie (69925). 800 w. R A G. Diagram and sections; over the Allegheny river at Black Run.

Raising

Steel Truss Spans Raised More Than 6 Feet Without Interruption to Traffic (71143). Ills. 1200 w. E R—June 17, 1916. Bridge at Kiskiminetas Junction, Pa. Details of lifting device.

Reconstruction

Strengthening the Cairo Bridge on Illinois Central R. R. (68665). Ills. 1200 w. E N—March 9, 1916. Details.

Cheap Devices Used in Reconstructing Truss Bridges Eliminate Costly Centering (71672). E. J. Doyle. Ills. 3000 w. E R—July 8, 1916. Detailed analysis of problems for strengthening.

The Reconstruction of the Keokuk Bridge (71947). Ills. 2200 w. R A G—July 21, 1916. New spans across Mississippi River.

The Reconstruction of the Ohio Connecting Bridge (68195). Ills. 2500 w. R A G—Feb. 18, 1916. Methods of maintaining traffic.

Raising a Three-Span Bridge Under Traffic (68197). Ills. 1200 w. R A G—Feb. 18, 1916. On Pennsylvania R. R.

Der Wiederaufbau der Alexander-Brücke in Warschau (68306 B). Karl Bernhard. Ills. 1200 w. Z V d I—Jan. 29, 1916. Reconstruction of Alexander steel bridge in Warsaw after destruction in War.

Reconstruction of Mississippi River Bridge at Keokuk (69516). Ills. 1700 w. E N—April 13, 1916. Open for traffic during work.

Reinforced Concrete

Abandoned Bridge Difficult to Destroy (72125). J. H. Weatherford. Ills. 1200 w. E R—July 29, 1916. Heavy charges of dynamite required to destroy reinforced-concrete structure.

See also Concrete Arch, under *Bridges*.

Review of 1915

Bridge Building (67533 A). 1800 w. Enr—Jan. 7, 1916. Progress and completion of important bridges.

San Francisco

Bridge and Tunnel Projects Across San Francisco Bay (73095). Ills. 3300 w.

BRIDGES

Suspension

W E—Sept., 1916. Summary of various plans for improving transportation.

Susquehanna

Die neue Verordnung betr. Eisenbetonbauten der der Aufsicht des Bundes unterstellten Transport-Anstalten (67033 B). Fritz Hübner. 2700 w. S B—Jan. 1, 1916. Serial, 1st Part. Building specifications for reinforced concrete structures in connection with Swiss railroads, especially bridges.

New Standard Specifications Issued by Ont. Ry. and Municipal Board (73787). David A. Molitor. 2000 w. Cn E—Oct. 5, 1916. Bridges, viaducts, and trestles.

Steel

The Cost and Details of Construction of a Steel Highway Bridge (74135). William C. Davidson. Ills. 1600 w. E & C—Oct. 25, 1916. Bridge spanning Aquilla Creek, Texas.

Steel and Concrete

Railroad Bridge of Steel and Concrete (69540 A). M. Robert Conover. Ills. 900 w. R E & M W—April, 1916. At Red Bank, N. J., over Shrewsbury River.

Steel Arch

Popolopen Steel Arch in the Hudson Highlands (72669). Ills. 500 w. E N—Aug. 24, 1916. High-level highway bridge.

Influence Diagrams for an Arch-Rib Hinged at the Ends Only (69804 N). Frederick Charles Lea. Plate. 23 pp. I C E, No. 4107—1915. Deals with two-hinged arches only.

Four-Span Steel-Arch Bridge at Indianapolis, Ind. (69210). Ills. 1100 w. E N—March 30, 1916. Plate-girder arches over White River.

Reversible Falls Steel-Arch Bridge of 565-Ft. Span (69690). Ills. 800 w. E N—April 27, 1916. Details of new bridge at St. John, N. B.

Stone

New Bridge Over the Ribble at Preston (68631 A). Ills. 1200 w. Enr—Feb. 18, 1916. Stone bridge in England.

Stresses

See Bridge Stresses under *Measurement*.

Substructures

Finish Deep Bridge Substructure, Designed to Reduce Work Under Water, Month Ahead of Time (71669). Frank M. Cortelyou. Ills. 3500 w. E R—July 8, 1916. Unusual plant used in building deep foundations.

Suspension

How the Forest Service Bridges the More Remote Stream Crossings (69387). Ills. 1800 w. E R—April 8, 1916. Inexpensive suspension bridges.

Consult Classification of the Index. See page 7.

Susquehanna

Design Features of the Dewey Suspension Bridge Across the Grand River, Near Dewey, Utah (66092). Ills. 1500 w. E & C. Dec. 1, 1915. Details.

Two Early Suspension Bridges Just Taken Down (67813). Ills. 1300 w. E N—Feb. 3, 1916. In New Brunswick, Can.

Theory of Displacements Applied to Analysis of Suspension Bridges (72562). C. S. Whitney. Ills. 2500 w. E R—Aug. 19, 1916. Stiffened suspension bridge with parabolic cable simplified in theoretical treatment. Example.

Die Drahtseil-Hängebrücke bei Landquart (71335 B). A. Walther. Ills. 2000 w. S B—May 20, 1916. Wire-cable suspension bridge at Landquart, Switzerland.

Susquehanna

Building Second Half of the Susquehanna Bridge (74024). Ills. 1600 w. E N—Oct. 19, 1916. Cumberland R. R. crossing at Harrisburg changed from single-track steel truss to a double-track reinforced concrete arch.

Swing

Considerations sur les ponts tournant sur pile centrale (68813 B). E. Boucher. Ills. 2000 w. Gn Cv—Feb. 19, 1916. Points connected with design and maintenance of swing bridges.

A Swing Bridge at Newport, Isle of Wight (68625 A). E. A. Slater. Ills. 2500 w. S M C E—Feb. 18, 1916. Details of construction.

Glebe Island Bridge, Port Jackson, New South Wales (69017 A). Ills. and Plate. 1500 w. Eng—March 3, 1916. Electrically-operated swing span.

Swing Bridge Over the Little Calumet River (71272). Ills. 1200 w. R A G—June 23, 1916. Structure on the C & W I Ry.

Glebe Island Electrically Operated Swing Bridge (66314 N). Ills. 1200 w. Cw. E—Nov., 1915. Features of construction.

The Lachine Canal Swing Bridge (66389 A). Max McD. Ills. 1000 w. R E & M W—Dec., 1915. Bridge of Can. Pac. Ry. in Quebec Province.

Neubau der Achereggbrücke über die See-Enge des Vierwaldstättersees bei Stansstad (66279 B). A. Rohn. Ill. 3000 w. S B—Dec. 4, 1915. New end-swing bridge over narrows of Swiss lake.

Moving and Placing American Railway Drawbridges by Means of Barges (66555 A). Ills. 2500 w. Enr—Dec. 3, 1915. At Milwaukee and on Harlem River.

Three-Hinge

Detroit-Superior 591-Foot Steel Arch Successfully Swung by Toggle Adjust-

BRIDGES**Viaducts**

ment (66791). Ill. 1200 w. E R—Dec. 25, 1915. Erection methods.

Three-Hinged Arch Girders with Vertical Ends Provide Barge Canal Clearance (66154). Ills. 1000 w. E R—Dec. 4, 1915. Special design built at Lockport, N. Y.

Trestles

Pile and Timber Trestle Bridges (68064 D). Ills. 18800 w. Am Ry Bldg & Bldg Assn—Oct., 1915. Report of committee, appendix and discussion.

Report of Committee VII—On Wooden Bridges and Trestles (68506 N). 27 pp. A R E A, Bul—Dec., 1915. Docks, wharves, wooden trestles and reinforced concrete; lag screws.

Railroad Bridge Piers Built Both Ways from Central Plant on Island (70486). Ills. 1200 w. E R—May 20, 1916. Four-rail trestle at Milton, Pa.

Viaducts

Great Variety in Design Reduces Cost of New Portland Harbor Bridge (68571). Ills. 3500 w. E R—March 4, 1916. Reinforced-concrete and steel cantilever and expanded spans.

Susquehanna Concrete Viaduct Built in Halves (69091). Ills. 3000 w. E N—March 23, 1916. Two-track concrete-arch viaduct, at Harrisburg, Pa.

New Susquehanna River Bridge at Harrisburg (68946). Ills. 1500 w. R A G—March 17, 1916.

The Twelfth Street Trafficway Viaduct, Kansas City, Missouri (69079 D). 2000 w. A S C E, Pro—March, 1916. Continued discussion of Howard's paper.

The Lethbridge Viaduct, Canada (69224 N). Ills. 2000 w. Cw E—March 1, 1916. Longest and highest bridge in the world.

Pamboan Viaduct, South Indian Railway (69815 N). Colin Robert White. Ills. 2500 w. I C E, No. 4100—1915. Construction across submerged reef.

Some Design Features of a Reinforced Concrete and Steel Viaduct Between Portland and South Portland, Maine (69751). Ills. 1000 w. E & C—April 19, 1916. Details of design and construction.

Queens Boulevard Viaduct, New York Elevated Line (71994). Alfred M. Wyman. Ills. 2000 w. R R—July 22, 1916. Ornamental concrete structure.

Concrete Viaduct with Special Expansion Provisions (70907). Ills. 1200 w. E N—June 8, 1916. Split piers used.

Special Plant Layout Expedites Construction of Brooklyn-Brighton Viaduct (71557). Ills. 1400 w. E R—July 1, 1916. Erection methods.

Consult Classification of the Index. See page 7.

Acoustics

CONSTRUCTION

Bins

The Lethbridge Viaduct (71899 A). W. M. Tait. Ills. 3000 w. C E M—July, 1916. Construction details.

Highest Arch Highway Viaduct of Striking Appearance Economically Constructed (68056). Ills. 2000 w. E R—Feb. 12, 1916. Near Akron, Ohio.

Methods and Equipment Used in Constructing a Reinforced Concrete Viaduct at Danville, Ill. (67979). N. B. Garver. Ills. 1000 w. E & C—Feb. 9, 1916.

Concrete Highway Trestle (68372). Ills. 3500 w. E N—Feb. 21, 1916. Details.

Two Large Concrete Viaducts on the St. Paul (68013). Ills. 1600 w. R A G—Feb. 11, 1916. Open spandrel arch type.

High Masonry Arch Viaduct in France Designed as a Two-Level Structure (66612). Ills. 800 w. A. Dumas in *Le Genie Civil*. E R—Dec. 18, 1915. Fontpédrouse viaduct spanning deep ravine.

Bloor Street Viaduct Construction, Toronto (66623). Ills. 1200 w. Cn E—Dec. 16, 1915. Year's progress on two large steel and concrete bridges.

Reinforced Concrete Street Viaduct at Denver, Colo. (67586). Ills. 2500 y. E N—Jan. 27, 1916. Features of a viaduct 8,500 ft. long, designed for heavy loads.

Progress on Bloor Street Viaduct, Toronto (73687). Ills. 1800 w. Cn E—Sept. 28, 1916. Important piece of reinforced concrete and steel construction.

The Caronte Viaduct (74100 A). Ills. and Plate. 2500 w. Eng—Oct. 13, 1916. Serial, 1st part. Details of a long viaduct and swing bridge in France.

Concrete Viaducts on the Chicago, Milwaukee and St. Paul (73840 A). Ills. 1500 w. R G—Sept. 29, 1916. Two large reinforced-concrete arch structures.

Appearance of Brooklyn-Brighton Viaduct, Cleveland, Improved by Special Features (71298). Ills. 1500 w. E R—June 24, 1916. Features of design and

Plate Girders of Record Weight in Worcester Viaduct (70904). F. B. Freeman. Ills. 1900 w. E N—June 8, 1916. Grade crossing of B. & A. R. R. has longest plate-girder. Weight 170 tons.

St. Louis Municipal Bridge East Approach a Steel Viaduct Nearly 3 Miles Long (65874). Ills. 800 w. Eng Rec—Nov. 20, 1915. Details.

Fire Damage to Steel Viaduct and Method of Repair (65951). Ills. 900 w. Eng News—Nov. 25, 1915. Restoring Nickel Plate viaduct at Cleveland, O.

Hopple Street Viaduct, Cincinnati, Is Built with Cantilever Beams of Arch Form (73443). Edgar K. Ruth. Ills. 2500 w. E R—Sept. 23, 1916. Reasons for design and layout.

Vibrations

Vibrations and Oscillations of Bridges (71717 A). D. H. Remfry. Ills. 3500 w. R G—June 23, 1916. Serial, 1st part.

Wind Damage

Wind Damages Highway Bridge (73252). Ills. 1000 w. E R—Sept. 16, 1916. Tornado nearly overturns Sugar Island bridge, over the Kankakee River in Illinois.

CONSTRUCTION

Acoustics

Acoustics of Auditoriums (65508 B). F. R. Watson. Ills. 1000 w. Br Build—Oct., 1915. Investigation of the armory of the University of Illinois.

Aesthetics

The Engineer and Standards of Beauty (68207). G. R. G. Conway. Ills. 5500 w. Cn E—Feb. 17, 1916. From address before Ottawa Branch of Can. Soc. of Civ. Engrs. Examples.

Aggregate Washing

Portable Washing Plant for Preparing Aggregates for Concrete Road Construction (71658). H. Colin Campbell. Ills. 2500 w. E & C—July 5, 1916. Design for gravel screening and washing plant.

Australia

Engineering Features of the Commonwealth Capital (73894 N). Ills. 2500 w. Cw E—Sept., 1916. Serial, 1st part. Details of the building of Canberra, the political capital of federated Australia.

Backfilling

Mechanical Tamping of Trench Backfill (70221 A). C. W. Wilson. Ills. 2000 w. Mun E—May, 1916. Method and machine.

Banded Columns

Esperienze Sull' Azione Della Cerchiatura Nelle Colonne Di Cemento Armato (74229 B). Ills. 1000 w. Ind—Oct. 1, 1916. Effect of hoops or bands on reinforced concrete columns.

Bank Vaults

Modern Practice in the Design of Bank Vaults (70615 B). Frederick S. Holmes. Ills. 3500 w. Bkblid—May, 1916. Serial, 1st part.

Bins

Behälter-Auslaufversuche und neuzzeitliche Bauweisen von Verschlüssen für Körnige und Stüchtige Massengüter (68804 B). M. Buhle. Ills. 1800 w. Z V d I—Feb. 19, 1916. Serial, 1st part. Investigation of the flow of grains and fine mate-

Consult Classification of the Index. See page 7.

Blasting

rial through discharge gates and new methods of control.

Ferro-Concrete Bunkers at the Brymbo Works, Wrexham (70524 A). F. C. Coleman. Ills. 2000 w. C G—May 5, 1916. Details of lime and ore bins.

Blasting

Blasting Boulders and Rock Ledges (73346). Thomas M. Knight. Ills. 800 w. E & C—Sept. 20, 1916. Methods employed.

Building Code

Building Area, Height and Other Limitations to Use of Private City Property Compiled (65721). Nelson P. Lewis. From a paper read at Engng. Cong. 2500 w. Eng Rec—Nov. 13, 1915. American and European practice.

Building Districts and Restrictions to Be Based Upon Definite Principles (68326). 2000 w. E R—Feb. 26, 1916. Work of New York Commission.

Ancient Lights (67664 A). A. E. Porte. Before Engng. & Sci. Assn. of Ireland. 4000 w. S M C E—Jan. 14, 1916. Résumé of English law, graphic method for loss of light due to obstructions.

Building Details

Columns in First Floor of Boston Theater Avoided by Use of 106-Foot Truss (72952). Ills. 1500 w. E R—Sept. 2, 1916. Special balcony framing.

New Columns and Trusses to Support Added stories in Engineering Societies Building (73624). Ills. 1200 w. E R—Sept. 30, 1916. Foundation details, cantilever and connecting trusses.

Building Failure

Failure of Roxbury School Building Apparently Caused by Faulty Brick Piers (72954). Ills. 2000 w. E R—Sept. 2, 1916. Investigation and report, by Sanford E. Thompson, into cause of collapse.

Building Laws

Building Districts Defined for New York City (72407). Map. 700 w. E R—Aug. 5, 1916. Limitations of height and use.

Building Restriction in New York (72429). 1800 w. Mun JI—Aug. 10, 1916. Serial, 1st part. Recently adopted regulations.

Buildings

Does It Pay to Improve Manufacturing and Industrial Buildings Architecturally? (73614 B). George C. Nimmons. Ills. 12 plates. 7800 w. Bkbl—Sept., 1916. What an architect can do.

The Modern Manufacturing Building (73615 B). John J. Klaber. Ills. 4 plates. 3300 w. Bkbl—Sept., 1916. Its development as shown by structures in the eastern states.

CONSTRUCTION**Concrete**

Steel Frame of Printing Crafts Building Designed to Prevent Vibration (67174). Ills. 1000 w. E R—Jan. 8, 1916. Building in New York City.

Wreck 15-Story Building and Replace with 17-Story Structure in 142 Days (66149). Ills. 900 w. E R—Dec. 4, 1915. Rapid work in Chicago.

The Bell Parkway Building (72680 A). Ills. 3500 w. E C P, Pro—Aug., 1916. Detailed description of Philadelphia building.

Caissons

The Rolling and Floating Steel Caissons of the Levis Dry Dock at Lauzon, P. Q. (70093). Lesslie R. Thomson. Extract from paper before Can. Soc. of Civ. Engrs. Ills. 4000 w. Cn E—May 4, 1916. Serial, 1st part. Design, fabrication and erection.

Chimneys

Defective Chimneys (71430 A). Charles E. Worthington. 2500 w. Sf E—June, 1916. Critical review of prevailing practice.

The Capacities of Chimneys (72589). George A. Orrok. 2000 w. Pwr—Aug. 22, 1916. Factors that influence the capacity.

Coal Dock

Reinforced Concrete Combined with Timber for Coal Pockets and Trestle (67172). Charles F. Dingman. Ills. 1000 w. E R—Jan. 8, 1916. Structure at Poughkeepsie, N. Y.

Coaling Plant

A Large Reinforced Concrete Coaling Plant (73542). Ills. 1500 w. R A G—Sept. 29, 1916. New station at Proctor, Minn., equipped with modern machinery.

Cofferdams

Failure of Masonry and Rock Ledge Cofferdam at Louisville and Portland Canal (67747 N). J. C. Oakes. Ills. 9 pp. Prof Mem—Jan.-Feb., 1916. Analysis.

Coliseum Roof

Springfield Coliseum Roof Supported by 200-Foot Arches Without Tie Rods (73792). Ills. 1500 w. E R—Oct. 7, 1916. Rapid erection of steel trusses.

Concrete

Reinforced-Concrete Structures (69792 N). Ills. 83 pp. I C E—Dec. 1, 1914. Discussion and correspondence on papers by Ball, Ellis, and Hammersley-Heenan.

Concreting in Freezing Weather, and the Effect of Frost upon Concrete (69791 N). John Hammersley Heenan. Ills. 2000 w. I C E, No. 4075—Dec. 1, 1914. Methods used.

The Mixing, Conveying and Placing of Concrete by Compressed Air (69617). Shirley Houghton. Ills. 8 pp. U S E, JI—March, 1916. Method and advantages.

Consult Classification of the Index. See page 7.

Conduits

CONSTRUCTION

Conduits

Forms for Concrete Work—Some Factors to be Considered in Their Design (69511). R. A. Sherwin. Abstract of paper before Am. Con. Inst. Ills. 4500 w. Crt—April, 1916. Design and treatment.

The Vibrocel System of Construction (69583). Ills. 600 w. R G—March 24, 1916. Manufacture and use.

Some Examples of Dangerous Structures (69438 A). W. G. Perkins. Extracts from a paper before the Concrete Inst. 2200 w. S M C E—March 24, 1916. Causes of failures.

Screening and Concrete Plants for Building Use Gravel from Cellar Excavation (69386). W. R. Howard. Ills. 2000 w. E R—April 8, 1916. Rapid and economical layout employed on a Cincinnati building.

Tests of Reinforced Concrete Structures of the Great Central Railway (69789 N). James Benjamin Ball. Ills. 1200 w. I C E, No. 4105—Dec. 1, 1914. Detailed descriptions.

Design of New Germanic Museum Required Solution of Many Special Problems (69238). Chauncey R. Perry. Ills. 2500 w. E R—April 1, 1916. Framework independent of walls.

Die Eisenbetonbauten im Tiergarten in Nürnberg (65413 B). Hermann Goebel. Ills. 1500 w. B u E—Oct. 4, 1915. Buildings and other construction in reinforced concrete in Nuremberg Zoological Gardens.

Well-Designed Concrete Plant Aids Construction of Waterworks Dam (65724). Ills. 1800 w. Eng Rec—Nov. 13, 1915. Large capacity.

Concrete Manufacturing Buildings in Hoboken, N. J. (65674 A). Charles Fall. Ills. 1000 w. Archt & Build—Oct., 1915. Group of buildings under construction.

Conduits

Sammelkanal in Eisenbeton von 200/250 cm Lichtweite (65414 B). W. Schwaab. Ills. 1200 w. B u E—Oct. 4, 1915. Design and construction of a reinforced concrete conduit.

Present Practice in Concrete Design and Construction Summed Up at Convention Last Week (68324). Ills. 5 pp. E R—Feb. 26, 1916. Abstracts of papers.

Laying Concrete in Polar Weather (68002). W. E. Hardenburg. 1500 w. Mun JI—Feb. 10, 1916. Canadian Sewer.

Concrete Culvert Pipe and Concrete Piles (68069 D). Ills. 17500 w. Am Ry Bldg & Bldg Assn—Oct., 1915. Committee report, bibliography, discussion.

Concreting Plant for Halifax Ocean-Terminal Work (68006). Inset. Ills.

2200 w. E N—Feb. 10, 1916. Details of working and handling large blocks.

Waterproofing Concrete Roof of Pier (68021 A). J. B. Gardiner. Ills. 1500 w. R E & M W—Feb., 1916.

Some Notes on Reinforced Concrete. (67663 A). R. M. Kearns. Ills. 3500 w. S M C E—Jan. 14, 1916. Read at Surveyors' Inst. New Stationery Office in London.

Die Eisenbeton-Hallenbinder der neuen Markthalle am Dorotheenplatz (67710 B). H. Nitzsche. Ills. 2000 w. B u E—Jan. 4, 1916. Reinforced-concrete arch trusses for Stuttgart market; design.

Methods and Cost of Constructing a Reinforced Concrete Building (67941). E. W. Robinson. Ills. 2500 w. C-CA—Feb., 1916. County Home of Bexar County, Tex.

Recent Methods of Transmitting Concrete (71261). J. F. Springer. Ills. 2000 w. Mun JI—June 22, 1916. Use of compressed air.

The Manufacture and Sale of Concrete Burial Vaults (66504). 2800 w. C-C A—Dec., 1915. Materials and methods.

Ferkelhalle Husum (66204 B). Ills. 1200 w. B u E—Nov. 3, 1915. Calculation and construction details of concrete pig market in city of Husum.

Engineer Builds Economical Concrete House with Simple Equipment (67312). Ills. 2000 w. C-C A—Jan., 1916. What can be done by one who builds his own residence.

Contractor Handles Electrically Concrete Materials for Huge Chicago Hotel (67084). Ills. 1000 w. E R—Jan. 29, 1916. Plant and methods.

Large Volume of Concrete Handled in Small Batches at Halifax Ocean Terminals (67081). Ills. 3500 w. E R—Jan. 29, 1916. 1,000 yds. a day in ¼-yd. batches.

Discussion of Some Special Methods of Reinforced Concrete Design (67443 B). J. R. Worcester, H. B. Andrews and M. J. Lorente. 2000 w. B S C E, JI—Jan., 1916.

New Features in Concrete Spouting Plant (67100). Ills. 1300 w. E N—Jan. 6, 1916. Field museum building in Chicago.

The Design and Construction of Forms for Concrete Work (68495). R. A. Sherwin. 2500 w. E & C—March 1, 1916. Serial, 1st part.

Pneumatic Concrete Mixing and Placing, New York Subway (68938). A. E. Comstock. Ills. 1800 w. E N—March 16, 1916. Methods on 59th-60th-St. subway.

Consult Classification of the Index. See page 7.

Contract Work

Concrete Post Factory of the Burlington (68945). W. W. Eldridge. Ills. 1600 w. R A G—March 17, 1916. Plant and methods.

Flat Slab Used at Lackawanna South Orange Crossing (68939). Ills. 1500 w. E N—March 16, 1916. Methods of construction.

Concrete Roundhouse Constructed by the Unit Method (68723 A). Shirley Houghton. Ills. 3000 w. W E—March, 1916. At Redondo Junction, Cal.

Design and Construction Features of a Reinforced-Concrete Hotel Building at Lake Louise, Alberta, Canada (68893). William Wren Hay. Ills. 2000 w. E & C—March 29, 1916. Descriptive of design and methods.

Methods and Equipment Used in Constructing the Methodist Book Concern Building, Cincinnati, O. (70287). Ills. 1000 w. E & C—May 10, 1916.

Unit-Bilt Method of Reinforced Concrete Construction (70112). Shirley Houghton. Ills. 12 pp. U S E JI—Apr., 1916. Description of this type.

Some Odd Jobs of Concrete About a Country Place (70383). William Main. Ills. 2000 w. Crt—May, 1916. Details of small work.

Construction of a High Concrete Tank at Knoxville, Tenn. (70384). Robert Lindsay Mason. Ills. 800 w. Crt—May, 1916.

Contract Work

Devising a System for Carrying on Construction (70433). Daniel J. Hauer. 3000 w. Cnr—May 15, 1916. Essentials of a system.

Cofferdam

The Forty-Sixth Street Pier Cofferdam, New York (73230). Ills. 2500 w. Cnt—Sept., 1916. Unbraced steel sheet pile cofferdam, 1000 ft. long.

Concrete

Big Stack Falling from Broken Boom Tests Concrete Floor (73587). Henry Blood. Ills. 1500 w. E N—Sept. 28, 1916. Steel stack weighing 6500 lbs. drops 145 ft.

Pneumatic Concreting and Its Development (72929). J. H. Graham. Ills. 1100 w. E N—Aug. 31, 1916. The development of a mixing and conveying unit and its details.

Catskill Aqueduct Concrete Forms (72390). Ills. 1600 w. Cnt—Aug., 1916. Serial, 1st part. Inside and outside forms for large horse shoe shaped structures.

Addition to Detroit Plant Sets New Mark for Rapid Concrete Construction (73787). Ills. 1500 w. E R—Oct. 7, 1916. Rapid construction.

CONSTRUCTION

How a Concrete Wall Was Built to Reinforce an Old Brick Retaining Wall (73653 A). Daniel J. Hauer. 2200 w. Cnr—Oct. 1, 1916. Shows how profits could have been increased.

Tearing Down an Old Concrete Ice Factory (74020). Arthur G. Hoadley. Ills. 1800 w. E N—Oct. 19, 1916. Details of wrecking methods.

Reinforced-Concrete Frame of New Germanic Museum at Harvard Is Unusually Complex (69237). Ills. 1800 w. E R—April 1, 1916. Difficult character of form work.

Concrete Handling

Motor Trucks Distribute Materials Within the Job (73253). Ills. 2000 w. E R—Sept. 16, 1916. Wet concrete handled at 20 cents a yard on Cleveland bridge.

Corrosion

Corrosion of Steel Wharves at Kowloon (69790 N). Somers Howe Ellis. Ills. 2200 w. I C E, No. 4090—Dec. 1, 1914. In Hong Kong harbor. Construction and conditions.

Contract Forms

Do Engineers Need Standard Contract Forms Backed by National Societies? (70672). 3000 w. E R—May 27, 1916. Documents of Am. Inst. of Archts. contrasted with engineering practice.

Contractors' Bonds

The Contractor's Bond (70781). John M. Wilson. Read at Road Bldrs. Inst., Seattle. 2500 w. G R—June 3, 1916. Necessity, requisites, validity, etc.

Construction Camps

Camping Instructions and Outfit Required for Construction Crews (70862). Walter H. Meier. 2500 w. E & C—June 7, 1916. For guidance of the construction foreman.

State-Wide Clean-Up of Labor Camps in California (70906). Ills. 1600 w. E N—June 8, 1916. Reconstruction.

Construction Lighting

Lights for Night Work (71828 A). Daniel J. Hauer. 1800 w. Cnr—July 15, 1916. Styles of contractor's lights and methods of operating them.

Dam Failure

Failure of Diversion Dam on Salt River Project (70620). Ills. 1200 w. E N—May 25, 1916. Low weir fails under high water.

Dams

See same heading under *Water Supply*.

Derricks

Stresses in 50-Ton Steel Derrick Reduced by Elimination of Goosenecks (67558). Ills. 1000 w. E R—Jan. 22, 1916. Details of a cast-steel head which takes the place of goosenecks.

Derricks

Consult Classification of the Index. See page 7.

Diary

Long 15-Ton Guy Derrick Folds Into Compact Form (65332). Ills. 1000 w. Eng Rec—Oct. 30, 1915. Ball-and-socket umbrella hood replaces usual gudgeon pin.

Diary

Construction Engineers' Field and Office Diary (67458). J. C. L. Fish. Ills. 1500 w. E N—Jan. 20, 1916. Systematic plan of keeping diary.

Difficult Operations

Underpinning, Raising and Moving Large Structures (73602 N). Frank W. Skinner. Ills. 30 pp. B'klyn Engrs' Club—1916. Details of skillful methods.

Docks

Reinforced Concrete Ore Dock at Ashland, Wis. (72416). W. E. King. Ills. 2700 w. E N—Aug. 10, 1916. Details of fireproof ore dock on Great Lakes.

Dome

Dome of S. Maria del Fiore, Florence (72731 B). Richard Franz Bach. Ills. 3500 w. Bkbl'd—Aug. 1916. A study of its structural system.

Drills

Hand Drills in Structural Work. (69691). Charles C. Phelps. Ills. 1200 w. E N—April 27, 1916. Costs and methods of out-of-ordinary uses, especially in steel.

Dump-Cars

Types of Dump Cars Used on Construction Work (73580). Ills. 3600 w. E N—Sept. 28, 1916. Serial, 1st part. Small hopper cars and high-body tilting cars are considered in present article.

Earthquakes

Structural Engineering and Earthquakes (66786). John C. Branner. 3000 w. E R—Dec. 25, 1915. Need of study of phenomena.

Contributo allo studio delle azioni sismiche sugli edifici (68307 B). Umberto Puppini. 1500 w. M T—Jan. 30, 1916. Mathematics and theory of influence of seismic waves upon structures.

Electrolysis

See STREET AND ELECTRIC RAILWAYS.

Equitable Building

Equitable Building Construction (71700). Ills. 2000 w. Cnt—July, 1916. Serial, 1st part. Methods and plant used.

Essex Plant

Construction of a Big Plant (72879). Ills. 6500 w. P E, C—Sept. 1, 1916. Serial, 1st part. Special features of a New Jersey electric plant.

Excavation

Loading Wagons at Street Level on Basement Excavation (69298). Ills. 1500 w. Cnr—April 1, 1916. Traction shovel with ditcher bucket.

Rock Drilling with Deep Hole Wagon Rigs Shows Speed at Low Cost (69935).

CONSTRUCTION

Excavation

Charles A. Hirschberg. Ills. 2000 w. E R—April 29, 1916.

Excavating for Side Tracks in Baltimore (71566 A). Daniel J. Hauer. Ills. 2000 w. Cnr—July 1, 1916. Critical comments on methods used in operating a steam shovel.

Subaqueous Excavation at the Halifax Ocean Terminals (67819). Ills. 1200 w. E N—Feb. 3, 1916. Drilling and loading.

Subaqueous Rock Excavation (65827). Charles C. Phelps. Ills. 3600 w. Eng News—Nov. 18, 1915. Serial, 1st part. Development of American practice. Use of drill barges for non-tidal waters.

The Brownhoist Shnoble Drag-Line Bucket (65636 A). Ills. 700 w. Engng—Oct. 22, 1915. Manufactured in Cleveland, Ohio.

Moving Dry Earth by Wet Methods (68831 N). William C. Morse. 5 pp. P N S E, Pro—Dec., 1916. Kinks in hydraulic methods.

Hydraulic Excavation of a Large Cut in Cleveland, Ohio, Grade Crossing Elimination (71911). C. E. Drayer. Ills. 900 w. E & C—July 19, 1916. Outlines methods of work.

Improved Method of Very Deep Excavation in Sand (73231). Ills. 1500 w. Cnt—Sept., 1916. Sides of cut sheeted in narrow trenches. Pits more than 80 ft. deep excavated only to neat lines.

New York Subway's Largest Elevator Shaft Sunk Under Forty-Second Street (72951). Ills. 1600 w. E R—Sept. 2, 1916. Rock dropped into Steinway tunnel, 72 ft. below street.

Excavation and Foundations for a Large Pumping Station (72942 A). Ills. 1800 w. Cnr—Sept. 1, 1916. Machinery substituted for hand methods.

Electrically Driven Dragline Scrapers Dig 45-Mile Irrigation Canal (67082). Ills. 2000 w. E R—Jan. 29 1916. Crossing desert on Sun River project.

Excavation for the Baldwin Reservoir, Cleveland (70057). Ills. 1200 w. E N—May 4, 1916. Methods.

See also same heading under *Measurement*.

Excavators

Mammoth Electric Draglines Dig Diversion Channels and Construct Levees (71296). Ills. 2500 w. E R—June 24, 1916. Earth handling methods on Little River, Missouri.

New Trench-Excavation System (70909). Ills. 1700 w. E N—June 8, 1916. Method devised by John F. Rourke in N. Y. subway work.

Digging Gravel From River Bed by a Cableway Excavator (72507 A). Ills.

Fences

1500 w. Cnr—Aug. 15, 1916. Cost of digging with slackline cableway.

Factories

Canadian Plant for Making Acids and Explosives Built at Rate of \$300,000 a Month (70675). Ills. 1800 w. E R—May 27, 1916. Seventy-five scattered buildings, railroad yard and filtration plant completed in twenty weeks.

Fences

Wire Fences and Concrete Posts (69501 D). Ralph N. Wheeler. Ills. 2000 w. N E W W A, JI—March, 1916. Points for getting best results.

Fire Protection

Fire Fighting and Fire Prevention. (66048). Frank Williams. Ills. 2500 w. PE, C—Dec. 1, 1915. Serial, 1st part. System of modern loft building.

The Hollow Metal Door in Fireproof Buildings (66649 A). H. A. Seeley. Ills. 2000 w. C C E—Dec., 1915. Materials, construction, tests, etc.

See same heading under INDUSTRIAL MANAGEMENT, *Welfare and Safety*.

Floors

Slab Design to Use Less Concrete Is Verified by Experiments (66505). Robert B. Melvin. Ills. 1800 w. C-C A—Dec., 1915. Opposed to commonly accepted theories.

Cresoted Wood Block Floors for Railroad Buildings (66586). Ills. 3500 w. R A G—Dec. 17, 1915. Precautions and results.

Heavy Vault Floor Framed into Existing Columns in Basement of Equitable Building (70966). Ills. 800 w. E R—June 10, 1916. Difficult details.

The Thickness of Flat Slab Floors (72039). Henry T. Eddy. 2200 w. E & C—July 26, 1916. Method of computing.

Flat-Slab Floor Failure Due to Poor Brick Wall Columns (72422). Ills. 2500 w. E N—Aug. 10, 1916. Description by Sanford E. Thompson of Failure at Roxbury, Mass.

Specifications for Plain Concrete Floors (70983). 2000 w. W E—June, 1916. Suggested by Portland Cement Assn.

An Investigation of Composition Flooring (73557). R. R. Shively. From a paper before the Am. Chem. Soc. 3000 w. E & C—Sept. 27, 1916. Investigation made at Mellen Inst. of Ind. Research.

The Groined Arch as a Means of Concrete Floor Construction (74034 B). H. Whittemore Brown. Ills. 24 pp. B S C E, JI—Oct., 1916. Criticism of present methods.

Concrete Floor Troubles (65860). Mac Rae D. Campbell. 1500 w. Ry Age Gaz—Nov. 19, 1915. Particularly requirements for railroad construction.

CONSTRUCTION

Foundations

See also Floors, under *Bridges*; and Wood Block, under *Materials of Construction*.

Fortification

Fortification (72136 B). H. B. Sauerman, with discussion. Ills. 46 pp. W S E, JI—May, 1916. Modern trench warfare.

Foundations

Concrete and Timber Crib Accurately Placed for Vancouver Wharf (71980). R. Mackay Fripp. Ills. 1500 w. E R—July 22, 1916. I-beam drag levels foundation for Dominion Government pier, the center walls of which are concrete and timber cribs.

Largest Bridge Caissons Rivalled by Timber Crib Sunk in Free Air in 34 Days (71976). Ills. 2000 w. E R—July 22, 1916. On causeway across Bear Lake, Utah.

Largest Dredging Caisson Sunk as Building Foundation (71943). Ills. 1800 w. E N—July 20, 1916. At Bear Lake, Utah.

Subway Columns and Girders Designed to Support Future High Office Building (71981). Ills. 1000 w. E R—July 22, 1916. Unusual construction in N. Y. City.

Cylinder Pier Foundations Laid Inside Sheetpile Wells (72510). C. S. Boardman. Ills. 2000 w. E N—Aug. 17, 1916. Foundations of Buffalo Gen. Elec. Co.

Sand Sluiced Around Field Museum Columns, Chicago, Holds Them for More Fill by Conveyors (72715). Ills. 1500 w. E R—Aug. 26, 1916. Unusual methods in foundation work.

The Employment of Mechanical Soil Compression in Foundation Work (72621 A). Charles Dangen. Ills. 2500 w. C E M—Aug., 1916. Method of securing solid foundations at low cost.

The Economic Design of Pile Foundations (73558). Charles E. Anderson. Diagram. 2500 w. E & C—Sept. 27, 1916. Data based on practical work.

Foundations (67870 A). Charles T. Main. Also discussion. 5500 w. A S M E, JI—Feb., 1916. General treatment.

Ausführungen von Gründungen mit Pressbetonpfählen (67712 B). August Wolfsholz. Ills. 1000 w. B u E—Jan. 4, 1916. Serial, 1st part. Methods of constructing foundations with moulded concrete piles.

Flachgründungen bei Wohnhausbauten in Budapest (65412 B). Hugo Szekely. Ills. 1500 w. B u E—Oct. 4, 1915. Design and construction of flat reinforced concrete foundations for apartment houses in Budapest.

Consult Classification of the Index. See page 7.

Framing

Concrete Pile and Cylinder Foundations at Charleston (65687). Ills. 2000 w. Eng News—Nov. 11, 1915. Cylinders driven into clay with steam hammer; piles in cylinders.

Methods and Plant Used in Constructing the Foundations for the Field Museum of Natural History, Chicago, Ill. (65943). Ills. 2500 w. Engng & Con—Nov. 24, 1915. Layout of construction plant, with cost data.

Building Foundations 150 Feet Under Scranton Armory (73857). Ills. 1900 w. E N—Oct. 12, 1916. A \$300,000 building cracked by subsidence.

Foundations (66565 N). Charles T. Main. 18 pp. A S M E—Dec., 1915. Testing soil; excavation; structures; stability, etc.

Pile-and-Mat Foundation for Power House in Marsh (66353). Ills. 600 w. E N—Dec. 9, 1915. Method used at Essex power station, of Newark, N. J.

Die Berechnung der nachträglichen Grundmauerwerkverbreiterung, Bauweise Heimbach (66203 B). Robert Schönhöfer. Ills. 2000 w. B u E—Nov. 3, 1915. Heimbach method for calculating stepped-out foundation walls.

Foundations of the Lincoln Memorial in Washington, D. C. (68845 B). James A. O'Connor. Ills. 20 pp. P M—March-April, 1916. Details of substructure for monumental building.

The Foundation of the Union National Bank Building, Cleveland, Ohio (69041). R. B. Buettell. Ills. 1600 w. Wis E—March, 1916. Concrete piles.

Building an Unusual Foundation for a Heavy Machine (68518). G. L. Knight. Ills. 2100 w. E N—March 2, 1916. Turbine installation in existing plant.

Building Power House and Dam on Sand Foundation (71085). Ills. 3400 w. E N—June 15, 1916. On Wisconsin River at Prairie du Sac, Wis.

Foundation for a 100000 Kw. Power Plant (70978). Ills. 2500 w. Cnt—June, 1916. Deep piers for the Buffalo General Electric Co.

Novel Theory Applied to Difficult Foundation (71288). Sifroy Joseph Fortin. 3500 w. Cn E—June 22, 1916. Method employed for the Federal Legislative Palace in Mexico City.

Framing

More on Bolted and Lagscrewed Joints in Timber (74148). H. D. Dewell. 1300 w. E N—Oct. 26, 1916. Continuation from issues of July 20 and 27, 1916.

New Tests of Bolted Joints in Timber Framing (71946). H. D. Dewell. Ills.

CONSTRUCTION

4300 w. E N—July 20, 1916. Extensive tests.

Lagscrewed Joints in Timber (72061). H. D. Dewell. Ills. 1700 w. E N—July 27, 1916. Results of tests.

Gas Tanks

Methods Used in Re-leveling a 200,000-cu. ft. Gas Holder (70596). A. R. Schiller. Read before New England Assn. of Gas Engrs. 2000 w. E & C—May 24, 1916. Methods for gas-holder distorted by settlement of foundation.

Grain Elevators

New Grain Elevator of the Western Maryland Ry. at Baltimore, Md. (68709). Ills. 1000 w. R R—March 11, 1916. At Port Covington.

The Failure and Righting of a Million-Bushel Grain Elevator (70637 D). Ills. 1500 w. A S C E, Pro—May, 1916. Continued discussion of the paper by Alexander Allaire.

Design of a Million-Bushel Public Grain Elevator at New Orleans, La. (67137). Ills. 2000 w. E & C—Jan. 15, 1916. General features.

The Design and Equipment of the Clyde Trustees' New Granary at Meadowside (66484 N). George H. Baxter. Ills. 38 pp. I E S S—Oct., 1915. General description.

The Failure and Righting of a Million-Bushel Grain Elevator (66719 D). Alexander Allaire. Ills. 6500 w. A S C E—Dec., 1915. At Winnipeg.

Grouting

Tunnel Grouting in Brooklyn End of Catskill Aqueduct (72269). O'Kelly W. Myers. Ills. 3300 w. E N—Aug. 3, 1916. Method of controlling water inflow while placing concrete lining and of grouting leaks.

Grouting an Effective Remedy for Stopping Leakage in Tunnels and Shafts (69545). James F. Sanborn. Ills. 4000 w. E R—April 15, 1916. Serial, 1st part. Experience on Catskill Aqueduct; suggestions.

Grouting in the Pressure Tunnels of the Catskill Water Supply City of New York, with References to Experience in Other Works (73603 N). Jas. F. Sanborn and H. M. Freeman. Ills. 85 pp. B'klyn Engrs' Club—1916.

Grouting Process Used in Closing Cracks in Reinforced Concrete Canal at Napoleon Avenue and Coliseum Street (71036 B). Alf. F. Theard. 1000 w. L E S, Pro—June, 1916. Conditions and results.

Grouting Under Canal Lock Wall Foundations (67489). Eric P. Muntz.

Grubbing

Ills. 1200 w. C n E—Jan. 20, 1916.
Work on the new Welland ship canal.

Grubbing

Grubbing a Large Reservoir (67406 D).
George A. Winsor. 1000 w. N E W W
A, JI—Dec, 1915. Grubbing Kensico
reservoir.

Hangars

See MECHANICAL ENGINEERING, Aero-
nautics.

I-Beams

Straightening 70-Ft. I-Beams Bent by
Flood (72928). Ills. 700 w. E N—Aug.
31, 1916. Results of June flood at Harris-
burg, Pa.

Industrial Buildings

Design of Structure for Open-hearth
Use (73691). Charles A. Randorf. 3000
w. B F & S P—Oct., 1916. Points
where severe service demands special
handling.

The Sanitary Equipment of Industrial
Buildings (73617 B). Harold L. Alt.
Ills. 2500 w. Bkbl—Sept., 1916. Re-
quirements, designs, suggestions, etc.

Levees

Levee Building Machines (70121 B).
J. R. Slattery. Ills. 11 pp. P M—May-
June, 1916. Costs and details of work
with draglines and cableways.

Lighthouse

Building Concrete Lighthouse on Bran-
dywine Shoal (70462). T. J. Rout. Ills.
2100 w. E N—May 18, 1916. Structure
in Delaware Bay. Hollow floating con-
crete caisson.

Lowering Devices

Theory and Tests Presented for Design
of Sand Boxes to Lower Arch Centers
(74168). Frank P. McKibben. Ills.
2500 w. E R—Oct. 28, 1916. Import-
ance of lowering devices, describing types.

Moving

Moving a Sand Bin (69361). E. P.
Muntz. Ills. 700 w. Cn E—April 6,
1916. Methods employed on Welland
Canal.

Moving Plant

Moving Plant from South Jetty to
North Jetty, Humbolt Bay, California
(68848 B). George F. Whittemore. Ills.
15 pp. P M—March-April, 1916. Details
of handling construction equipment.

National Parks

See *Roads and Pavements*.

Oil Tank

Rebuilding a Burned Oil Tank (65828).
C. P. Bowie. Ills. 1500 w. Eng News—
Nov. 18, 1915. Methods adopted.

Patented Processes

See Patented Materials under *Materi-
als of Construction*.

CONSTRUCTION

Pole Holes

Piers

The New Chicago Municipal Recreation
Pier (70501). Ills. 1500 w. El R & W
E—May 20, 1916. Construction and elec-
trical features.

2,500-Ton Concrete Cribbs Are Built and
Launched in a "Shipyards" (67292). Ills.
1800 w. E R—Jan. 15, 1916. Methods of
work at Victoria, B. C.

Ore Pier of the Lehigh Valley R. R. at
Constable Hook, Bayonne, N. J. (68033).
Ills. 700 w. R R—Feb. 12, 1916. Plan,
sectional veins and details.

Concrete Ocean Pier Built in Form of
Hollow Triangle (73204). C. L. Roberts.
Ills. 1500 w. E N—Sept. 14, 1916. At
Redondo Beach, Calif.

Pile-driver

Construction Features and Cost of
Pile-driver Built for General Use Around
Water, Los Angeles, Cal. (66745). W. D.
Jones. Ills. 1200 w. E & C—Dec. 22,
1915. For wharves.

Piles

Cleaning Hollow Piles with a 10-In.
Orangepeel (66999). G. L. Knight. Ills.
1000 w. E N—Jan. 6, 1916. Miniature
bucket used for extracting debris.

A New Concrete Pile Driven from the
Point (68521). C. S. Howell. Ills. 900
w. E N—March 2, 1916. Driving frame
inclosing pile, rests on cast-iron point.

Pile Drawing (73218 A). Ills. 2000 w.
Eng—Sept. 1, 1916. Details of extractor,
its application and operation.

Steel Sheet Piles (73424). J. F.
Springer. Ills. 3000 w. Mun JI—Sept.
21, 1916. Types and patterns.

Pipe Lines

Methods Employed in Spanning the
Treacherous Brazos River with Two 10-
in. Gas Mains (70290). C. R. Sutton.
Ills. 1500 w. E & C—May 10, 1916.
Unusual difficulties at Waco, Tex.

Some Difficult Work in Large Gas Pipe
Laying Under the Lachine Canal and
Adjacent Swamps (66387). C. H. Osler.
Ills. 3500 w. A G L JI—Dec. 13, 1915.
Work at Montreal.

Pipes

Steel Reinforced Concrete Pipes (70857
A). Ills. 1500 w. Enr—May 19, 1916.
Work in progress at Leeds, with descrip-
tion of the "Bonna" system.

Plastering

Automatic Stucco and Plastering Ma-
chine (71514). Ludwig Eisenkramer.
Ills. 700 w. E C St L, JI—May-June,
1916. Description.

Pole Holes

Ditching and Digging Pole Holes with
Dynamite (71912). Thomas M. Knight.
Ills. 2000 w. E & C—July 19, 1916.
Methods.

Consult Classification of the Index. See page 7.

Power Plants**Power Plants**

Philadelphia Electric Company Power Station A-2 Has Four 12-Foot Steel Stacks 165 Feet High (68217). Ills. 2500 w. E R—Feb. 19, 1916. Steel-frame structure.

Power Station

Steel Framing of a Large Power Station (66832). Ills. 2700 w. E N—Dec. 30, 1915. Essex generating station, Newark, N. J.

Public Baths

Ante-proyecto para la construcción de baños públicos gratuitos en la ciudad de la Habana (72813 A). E. Borrero y Piedra. 10,000 w. S C I Rv—July, 1916. Discussion of proposed scheme for building free public baths in Havana.

Quay Walls

Cellular Type of Quay Wall at Halifax Terminals Compared with Other Designs (68058). Ills. 3000 w. E R—Feb. 12, 1916.

Radio Towers

Design of Darien Radio Towers (69092). C. A. Carlson. Ills. 2500 w. E N—March 23, 1916. Details of 600-ft. steel towers for wireless station.

Railways

See Construction under RAILWAY ENGINEERING, *Permanent Way and Buildings*.

Reconstruction

Étude sur les constructions économiques (65446 D). E. Cacheux. 27 pp. Soc Ing Civ Fr Mem—April-June, 1915. Principles which should govern in rebuilding after war.

Refuse Incinerator

Large Mill-Refuse Burner Built of Concrete and Brick (73582). N. J. Blagen. Ills. 1000 w. E N—Sept. 28, 1916. Unique structure at Hoquiam, Wash.

Reinforced Concrete

World's Reinforced-Concrete Construction Record Claimed for Frame of Philadelphia Factory (72405). Ills. 2000 w. E R—Aug. 5, 1916. Rapid work.

Reservoirs

Methods of Construction of a Concrete-Lined Oil-Storage Reservoir (67205). 1500 w. W E—Jan., 1916. Near Bakersfield, Calif.

Concrete-Lined Oil-Storage Reservoirs in California: Construction Methods and Cost Data (67601 D). 1200 w. A S C E, Pro—Jan., 1916. Continued discussion of E. D. Cole's paper.

Concrete-Lined Oil-Storage Reservoirs in California: Construction Methods and Cost Data (68353 D). 1000 w. A S C E, Pro—Feb., 1916. Continued discussion of E. D. Cole's paper.

Retaining Walls

Bone's Retaining-Wall Patent and Its

CONSTRUCTION**Slabs**

Anticipations (68007). Ills. 5000 w. E N—Feb. 10, 1916. General exposition.

Box Concrete Retaining Wall on Western Pacific Ry. (69369). J. H. Knowles. Ills. 1500 w. E N—April 6, 1916. Approach to railway bridge at Altamont, Cal.

Retaining Walls on Bathurst Street Hill, Toronto (70478). S. G. Talman. Ills. 1000 w. Cn E—May 18, 1916. Design and construction.

Riveting

See same heading under MECHANICAL ENGINEERING, *Machine Works and Foundries*.

Roof Drainage

Discussion of Conductor Heads for Roof Drainage (70335). Albert M. Wolf. Ills. 1800 w. E N—May 11, 1916. Available and suitable types.

Roof Failure

Details of Roof-Arch Collapse in Atlanta (71786). Ills. 1500 w. E N—July 13, 1916. Poorly braced wooden arch trusses fall over a skating rink.

Roofs

Insulating Concrete Roofs Against Condensation (66837). Albert M. Wolf. Ills. 4000 w. Cn E—Dec. 30, 1915. Methods and relative value.

Arch-Truss Roof for Drill Hall (67583). Ills. 1100 w. E N—Jan. 27, 1916. Roof of Chicago armory, erected without falsework.

Roof Supports

Long-Span Concrete Arched Bents Support Roof of Chicago Hebrew Institute (72718). Ills. 1500 w. E R—Aug. 26, 1916. Theory of analysis and deduction of formulas.

Roof Trusses

Reinforced Concrete Roof Trusses—Types in Use—Design Methods (71106). Albert M. Wolf. 5000 w. Crt—June, 1916. Serial. 1st part.

Sand Storage

Design and Construction Features of a Sand and Gravel Storage Plant (70385). G. D. Crain, Jr. Ills. 1200 w. Crt—May, 1916.

Sewers

See same heading under *Municipal*.

Slabs

Method of Designing a Rectangular Reinforced Concrete Flat Slab, Each Side of Which Rests on Either Rigid or Yielding Supports (73564 D). 3000 w. A S C E, Pro—Sept., 1916. Continued discussion of A. C. Janni's paper.

Method of Designing a Rectangular Reinforced Concrete Flat Slab, Each Side of Which Rests on Either Rigid or Yielding Supports (70640 D). 3000 w. A S

Slides

C E, Pro—May, 1916. Continued discussion of A. C. Janni's paper.

See also Slab Tests, under *Measurement*.

Slides

Stop Slides by Releasing Accumulated Water at Bulls Bridge Hydro-electric Plant (70671). Charles Rufus Harte. Ills. 2500 w. E R—May 27, 1916. Serious leakage from pond, a break in the canal bank and landslides occur in Connecticut.

Sound

Correction of Echoes and Reverberation in the Auditorium, University of Illinois (72351). F. R. Watson and James M. White. Ills. 18pp. U I, Bul., No. 87—May 29, 1916. Acoustical investigation.

Specifications

Equitable Specifications and Contracts (67385 A). Hillis F. Hackedorn. Also discussion. 9500 w. A E S JI—Dec., 1915. Equity and justice in relations between engineers and contractors.

The Relation Between Engineers and Contractors (71028 B). J. W. Rollins, with correspondence and discussion. 65 pp. E S W P, Pro—March, 1916. Discusses contracts and specifications.

Stacks

Design and Construction of Chimneys for Railways (66589). Ills. 3500 w. R A G—Dec. 17, 1915. Types, points considered in deciding details.

Unique Chimney Construction (68966). C. V. Johnson. Ills. 2000 w. Cn E—March 16, 1916. Monnoyer system of reinforced-concrete.

The Design of Steel Stacks (74136). W. A. Hitchcock, in *Jl. of Eng. of Univ. of Colo.* 2500 w. E & C—Oct. 25, 1916. New formulae and diagrams.

Stadium

The Yale Bowl (74137 D). Charles A. Ferry. 20 pp. A S C E, Pro—Oct., 1916. History and features of construction.

Architectural Possibilities of Reinforced Concrete Shown in City College Stadium (66915). Ills. 1500 w. E R—Jan. 1, 1916. Structure in New York City.

The Yale Bowl (71113 B). Thomas C. Atwood. Ills. 8500 w. B S C E, JI—June, 1916. Location, design, construction, etc.

Excavation and Embankment Construction in Building the Yale Bowl (71909). Ills. 1500 w. E & C—July 19, 1916. Data relating to methods.

Stairways

Economical Precast Stairway Design Developed for Panama Canal Lighthouse (72128). Walter F. Beyer. Ills. 1200 w. E R—July 29, 1916. Construction methods and detailed designs.

CONSTRUCTION

Terminals

Reinforced-Concrete Stairway for Hill-side Footway (71091). R. F. Odell. Ills. 1000 w. E N—June 15, 1916. Novel structure at Passaic, N. J.

Standardized Buildings

Standardized Industrial Buildings (68138 A). W. J. Austin. Ills. 1500 w. I A—Feb. 17, 1916. How standardization can be applied; with example.

Steelwork

Steel Skeleton of Bell Parkway Building Contains Heavy Portal Framing (70676). Ills. 1200 w. E R—May 27, 1916. Loads and provisions for wind stresses determine design for Philadelphia building.

Special Details Are Used in Design of Steel Elevated Structures in Brooklyn (71824). Ills. 1500 w. E R—July 15, 1916. Unusual and effective details developed.

Subways

Rock Tunneling in Lexington Avenue Subway, New York (73945). Ills. 1200 w. Cnt—Oct., 1916. Wide excavations.

Tunnel Work on Sections 8, 9, 10, and 11, Broadway-Lexington Avenue Subway, New York City (74139 D). 200 w. A S C E, Pro—Oct., 1916. Discussion of Israel v. Werbin's paper.

Tunnel Work on Sections 8, 9, 10, and 11, Broadway-Lexington Avenue Subway, New York City (72762 D). Israel V. Werbin. Ills. 50 pp. A S C E, Pro—Aug., 1916. Methods used in excavating and lining the tunnels between 53rd and 106th Sts.

Swimming Pools

Construction of a Concrete Swimming Pool at Pendleton, Ore. (69510). L. R. W. Allison. Ills. 400 w. Crt—April, 1916. Description and costs.

The Construction of an Open Air Concrete Swimming Pool in the Canadian Rockies (69509). William Wren Hay. Ills. 1000 w. Crt—April, 1916. At Banff, Alberta; to contain warm sulphur-impregnated water.

Tanks

Design and Construction of Elevated Concrete Tanks (69421). J. Alden Griffin. Ills. 2000 w. W E—April, 1916. Advantages of reinforced concrete and other materials.

Terminals

Connecticut Shipping Terminal at New London (65949). W. E. Clarke. Ills. 3500 w. Eng News—Nov. 25, 1915. Analysis of alternative design as to economic life.

Design and Construction Features of the Ocean Steamship Co.'s Terminal at Savannah, Ga. (65502). Plan & Ills. 1500 w. Engng & Con—Nov. 3, 1915. Descriptive.

Consult Classification of the Index. See page 7.

Tunnels

Trenching Machinery

Trenching Machinery Used for the Construction of Trenches for Tile Drains (67376 N). D. L. Yarnell. Ills. 26 pp. U S D A—Farmers' Bul 698. Describes types and discusses limiting conditions of work and cost of trenching.

Tunnels

Tunnel Drill Carriages—Their Economic Possibilities (67171). S. P. Brown. Ills. 4000 w. E R—Jan. 8, 1916. First of three articles discussing American and European practice.

Tunnel Lining by Compressed Air Mixing and Placing (67221). Ills. 5000 w. E & C—Jan. 12, 1916. Serial, 1st Part. Method; details of apparatus; examples, etc.

The Astoria Tunnel Under the East River for Gas Distribution in New York City (67600 D). 1500 w. A S C E, Pro—Jan., 1916. Continued discussion of the paper by John Vipond Davies.

Belt Conveyors a Success in Pneumatic Tunnel Construction at Boston, (67077). Ills. 2000 w. E R—Jan. 29, 1916. Haulage system for tunnels driven, lined and concreted in one operation.

Nicholson Tunnel on the Delaware, Lackawanna & Western (67219 A). Ills. 1000 w. R E & M W—Jan., 1916. Construction methods. Brick walls and arched brick roof.

Secure Subway Supports (67595 D). A. B. Lueder and W. J. R. Wilson. Ills. 3500 w. A S C E, Pro—Jan., 1916. Problems met and solved in construction of Sec. 13, Lexington Ave. Subway, N. Y. City.

Four Street Shaft Plants to Handle 300,000 Yards of Excavation in Twelve Months (67085). Ills. 1800 w. E R—Jan. 29, 1916. Subway section in crowded district. New design of plant.

Moodna Supplementary Shaft and Tunnel (74141 B). George J. F. Carey. Ills. 36 pp. Mun Engrs' JI—Oct., 1916. Details and methods used in construction.

Methods Adopted in the Construction of Rogers Pass Tunnel (72362 N). J. G. Sullivan. Ills. 6 pp. C S C E—Jan. 13, 1916. Double-track tunnel, five miles long, in British Columbia. Plan and construction.

Secure Subway Supports (69911 D). 900 w. A S C E, Pro—April, 1916. Continued discussion of paper by Lueder and Wilson.

The Laxaxalpam Aqueduct Tunnels, Mexico (69801 N). James Forgie. Ills. 33 pp. I C E, No. 4123—1916 (Abridged). Construction.

Tunnel Muck Turned into Concrete Lining Immediately Behind Heading (69932).

CONSTRUCTION

Tunnels

Ills. 2500 w. E R—April 29, 1916. Day labor system employed for Chicago water works.

The Wilson Avenue Water Tunnel, Chicago (72134 B). H. W. Clausen, with discussion. Ills. 30 pp. W S E, JI—May, 1916. The organization, plant, method of tunneling, and disposal of excavated material.

A Rapid and Accurate Method of Cross-Sectioning Tunnels (71830). T. H. Robertson. Ills. 1200 w. R R—July 15, 1916. Special device and its use.

Rapid Tunneling in Brazil (70461). J. C. Balcomb. Ills. 4200 w. E N—May 18, 1916. On water-power project above Rio de Janeiro.

Construction of the Rogers Pass Tunnel, Canadian Pacific Ry. (70499). J. G. Sullivan. Ills. 2500 w. R R—May 20, 1916. Double-track bore, five miles long.

City Tunnel of the Catskill Aqueduct (70584 N). Walter E. Spear. Maps & Ills. 15 pp. A W W A, JI—June, 1916. Location, excavation, tunnel lining, testing, cost.

The Construction of the Dorchester Tunnels Under Fort Point Channel (70317 B). A. A. Cohill. Ills. 2200 w. B S C E, JI—May, 1916. Details of work.

New Water Tunnel at Chicago (70619). Ills. 3300 w. E N—May 25, 1916. Wilson Ave. work.

The Astoria Tunnel Under the East River for Gas Distribution in New York City (66724 D). Ills. 1800 w. A S C E—Dec., 1915. Discussion of John Vipond Davies' paper.

Secure Subway Supports (69083 D). 3000 w. A S C E, Pro—March, 1916. Discussion of paper by Lueder and Wilson.

Columbia Highway Tunnel (68664). Henry L. Bowlby. Ills. 1200 w. E N—March 9, 1916. With large windows.

Needle-Beam Heading Method Applied to Sewer Tunnel in Dry Ground (68572). Ills. 1500 w. E R—March 4, 1916. Method developed on Newark section of Passaic sewer modified.

Concrete Water Tunnel Lining at Chicago (72458). Ills. 1500 w. E & M J—Aug. 12, 1916. Top-heading method considered most economical.

Jacketing a Railway Tunnel by Mining Methods (72420). Ills. 1300 w. E N—Aug. 10, 1916. Work on repair of Radebaugh tunnel on Penn. R. R.

Wall-Plate Drift Method Used for the Most Part in Twin Peaks Tunnel, San Francisco (68321). Ills. 1600 w. E R—Feb. 26, 1916. Methods and progress.

Method of Relining a Tunnel with Steam Jetted Concrete (68287). Harold

Consult Classification of the Index. See page 7.

Tunnels

P. Brown. Ills. 1500 w. E & C—Feb. 23, 1916. Read before Am. Concrete Inst.

Bypass Around Leaky Tunnel in Catskill Aqueduct (66351). Charles A. Hirschberg. Ills. 1500 w. E N—Dec. 9, 1915. Methods used.

Repairing a Tunnel Lining Under Difficult Conditions (66591). Ills. 1500 w. R A G—Dec. 17, 1915. Concrete atomizer used by C G W at Winston, Ill.

An Economic Comparison of European and American Methods of Driving Tunnel Heading (65944). Eugene Lauchli. 1800 w. Engng & Con—Nov. 24, 1915. Shows that no fair comparison can be made between the two.

Modern Methods in Railway Tunnel Construction (65366). Charles S. Churchill. Ills. 5000 w. Ry Rev—Oct. 30, 1915. From paper at Int. Engng. Cong. Methods of excavating and lining.

The Astoria Tunnel Under the East River for Gas Distribution in New York City (66022 D). 4500 w. Am Soc Civ Engrs, Pro—Nov., 1915. Discussion of John Vipond Davies' paper.

East River Tunnel Shields (65691). Ills. 1900 w. Eng News—Nov. 11, 1915. Details of 18-ft. shields.

Construction Plant and Methods Employed in Concrete Lining a Double Track Railway Tunnel Under Traffic (65824). Rodman Meacham. Ills. 2000 w. Engng & Con—Nov. 17, 1915. Methods of construction the L. & N. Diana tunnel.

Completing the Mount Royal Tunnel into Montreal (65546). Map & Ills. 3500 w. Ry Age Gaz—Nov. 5, 1915. Details of construction.

Methods Used in Building the Rogers Pass Tunnel (65686). Ills. 3000 w. Eng News—Nov. 11, 1915. Pioneer-heading system. Details.

Construction Progress on the Twin Peaks Tunnel (65537). A. J. Cleary. Ills. 1200 w. Eng News—Nov. 4, 1915. Methods and progress on highway tunnel, San Francisco.

Underpinning

Soil Tests Reported and Safe Underpinning Methods in Sand Described (65873). Ills. 2000 w. Eng Rec—Nov. 20, 1915. Special precautions necessary in N. Y. Subway excavation.

Underpinning Trinity Vestry Building for Subway Construction (72764 D). H. de B. Parsons. Ills. 27 pp. A S C E, Pro—Aug., 1916. Details of underpinning made necessary by subway construction.

Difficult Underpinning Along William St. Subway (69513). Ills. 2600 w. E N

CONSTRUCTION**Wrecking**

—April 13, 1916. Details for street-wide subway in New York.

Tests of Soil and Methods of Underpinning Buildings Adjoining Subway Construction in William St., New York (66743). John F. Greathead. Abstract from *Pub. Serv. Rec.* Ills. 4000 w. E & C—Dec. 22, 1915. Methods in connection with subway.

Vibration

Vibration and Noise (70136 N). Ills. 10 pp. T S—May, 1916. Caused by machines; means of eliminating.

Walkways

Inclined Walkways Replace Stairs and Elevators in New Victor Building at Camden (66006). Ills. 1200 w. Eng Rec—Nov. 27, 1915. Safety in exit.

Warehouses

The Bingham Warehouse, Cleveland, Ohio (66469). R. B. Buettell. Ills. 2000 w. Wis E—Dec., 1915. Heaviest type of reinforced concrete.

Some Structural Features of the Cotton Warehouses and Terminals of the Board of Commissioners of the Port of New Orleans (69487 A). Frank J. Trelease. Ills. 30 pp. L E S—April, 1916. Problems encountered, design and construction found advisable.

Wastes

Suggested Design of Disposal Plant for Creamery or Cheese Factory Wastes (73156). From a paper by A. Elliott Kimberly. Ills. 1000 w. E & C—Sept. 13, 1916. Description.

Waterproofing

Waterproofing Practice in the New York Subways (68710). Joseph Rosenzweig, in *Pub. Serv. Rec.* Ills. 2000 w. R R—March 11, 1916. Methods and materials.

Capitol Terraces at Last Made Waterproof (73720). Ills. 1800 w. E N—Oct. 5, 1916. Bituminous membrane 200,000 sq. ft. in area placed on terraces.

A Review of Various Experiences in Waterproofing (69512). R. B. Sleight. 2200 w. Crt—April, 1916. Methods and their advantages.

Water Tanks

Elevated Water Tanks (66251 N). 8 pp. T S—Dec., 1915. Relations to fire fighting; hazards; proper construction.

Wrecking

Dynamite, Oxy-Acetylene, Fire and Cranes Required to Wreck Concrete Bins (69548). Ills. 2000 w. E R—April 15, 1916. Tall cement stock house.

Half of Long Steel Viaduct at Cleveland Wrecked in Seven Days (68573).

Consult Classification of the Index. See page 7.

Arrowrock Dam

Ills. 1200 w. E R—March 4, 1916. Cutting torches used.

Dynamite Proves Effective in Wrecking of Panama-Pacific Exposition (72465). Ills. 2500 w. E R—Aug. 12, 1916. Ex-

IRRIGATION AND RECLAMATION**Drainage**

plosives reduce wrecking costs.

Methods Employed in Wrecking Reinforced Concrete Buildings (70382). Ernst Schick. (Abstract.) 2500 w. Crt—May, 1916.

IRRIGATION AND RECLAMATION**Arrowrock Dam**

The Arrowrock Dam (65812 B). Charles H. Paul. Ills. 2500 w. Boston Soc of Civ Engrs, Jour—Nov., 1915. Preliminary work and construction.

Arrowrock Dam (65808). M. F. Cunningham. 1200 w. Wis Engr—Nov., 1915. Construction methods.

Big Horn Canyon

Power and Irrigation Project for the Big Horn Canyon (73633). Ills. 4000 w. R R—Sept. 30, 1916. Project to build a dam 480 ft. high for development of hydro-electric energy, and irrigation.

Canada

Irrigation Surveys and Inspections (70953). Ills. 2500 w. Cn E—June 8, 1916. Information from recent report.

Canals

Machine for Placing Concrete Lining in Canal (68009). E. I. Davis. Ills. 2400 w. E N—Feb. 10, 1916. U. S. Reclamation Service at Hermiston, Ore.

Stoplog Barrier Regulates Romanov Canal (71982). Louis Ross. Ills. 900 w. E R—July 22, 1916. Intake at main diversion channel of Russian irrigation system in Eastern Turkestan requires no dam.

Cost of Structures of the Second Unit of the Dodson North Canal, Milk River Irrigation Project, Malta, Mont. (72411). A. E. Bechtel. Ills. 3000 w. E & C—Aug. 9, 1916. Serial, 1st part. Details of construction with costs.

Small Irrigation Canals Lined with Concrete to Prevent Seepage Water Loss (69546). C. E. Edwards. Ills. 3000 w. E R—April 15, 1916. Serial, 1st part. Construction and cost on Okanogan project in Washington.

Classification

A Complete Method for the Classification of Irrigable Lands (73561 D). F. H. Peters. Ills. 4500 w. A S C E, Pro—Sept., 1916. Classification of large area in Alberta is given in detail.

Dams

Elephant Butte Dam (73222 A). Ills. 1500 w. Enr—Sept. 1, 1916. Details of the construction of this dam in New Mexico for storing water for irrigation.

Dikes

Iets over de beweging van grondwater in zeedijken (70182 B). Ch. C. Coomans.

Ills. 2500 w. Ing—Apr. 15, 1916. Notes on the influence of ground water on sea dikes.

Distribution

Distribution Systems, Methods and Appliances in Irrigation (68038). J. S. Dennis, H. B. Muckleston, and R. S. Stockton. From paper at Int. Engng. Cong. 3000 w. Cn E—Feb. 10, 1916. Secrets of success.

Ditch Excavation

Excavating Machinery Used in Land Drainage (65498 N). D. L. Yarnell. Ills. 39 pp. U S Dept Agri, Bul 300—Nov. 10, 1915. Construction, application and performance.

Ditching

Ditching with Capstan Plows (67818). Ills. 1200 w. E N—Feb. 3, 1916. Horse and power capstans.

Drainage

Building Six Hundred Miles of Drainage Ditches (74023). Ills. 2300 w. E N—Oct. 19, 1916. Appliances and methods used.

Draining North Holland After January's Great Flood (74145). Jan Spaander. Ills. 2500 w. E N—Oct. 26, 1916. Repairing the dikes and building huge temporary pumping stations.

Low-Lift Pumping Plant Uses Distillate Fuel (73789). B. S. Nelson. Ills. 1500 w. E R—Oct. 7, 1916. Plant draining land near New Orleans.

The Spring Lake Drainage and Levee District (74190). Ills. 1200 w. El R & W E—Oct. 28, 1916. Substitution of electric drive for engine drive in Illinois.

Canalization of Half-Million Acre Drainage District Discloses Canal-Width Limits (73409). Ills. 1500 w. E R—Aug. 5, 1916. Interesting drainage methods.

Las Obras Y Proyectos de Desagües de Buenos Aires (72812 C). Delgado, Mercu and Waldorp. Ills. 12,000 w. U N P—Dec., 1915. Drainage projects for Buenos Aires.

The Little River Drainage District (72737 A). William A. O'Brien. Map and Ills. 25 pp. E C St L—July-Aug., 1916. Describes area, and drainage system.

"World's Largest Drainage Pumping Plant" (72505). Fred A. Olds. Also ar-

Consult Classification of the Index. See page 7.

Drains

ticle by Lawrence Brett. Ills. 4000 w. M Rd—Aug. 17 1916. Redeeming 50000 acres of land from a lake.

Drainage Engineering (70147 N). John T. Stewart. 13 pp. Affil Eng Soc Minn Bul—May, 1916. Broad survey.

Draining Great Swamps in New Zealand (73450 A). Ills. 1500 w. Enr—Sept. 8, 1916. Reclamation of areas in the Auckland Province.

Eenige theoretische beschouwingen over Kwel (73501 B). Ills. 1900 w. Ing—Aug. 12, 1916. Mathematical treatment of pressures exerted by springs and surface water.

Draining the Roseau River Swamp in Minnesota (68374). George H. Herrold. Ills. 1600 w. E N—Feb. 24, 1916. Improving channel and equalizing grade in northern part of state.

Drains

I. Capacities of Drains (71929 B). T. H. Harrod. II. The Rogue River Drain. W. S. Merrill. 1700 w. M E—1916. The first paper gives tables of discharge capacities of both tiled and open drains.

Elephant Butte

Great Elephant Butte Dam Practically Reaches Completion (70322). Ills. 1500 w. M Rd—May 11, 1916. Features of government enterprise for irrigation.

Excavating

Excavating Machinery (72748 N). G. B. Massey. Ills. 2500 w. M & E R—July, 1916. Serial, 1st part. The present number deals with irrigation ditches.

Flood Control

River Diversion and Flood Control in Missouri (72670). Ills. 3000 w. E N—Aug. 24, 1916. A \$4,000,000 job to reclaim 1,000 sq. mi. of land.

Flow

The Flow of Water in Irrigation Channels (69914 D). 4000 w. A S C E, Pro—April, 1916. Discussion of Ellis' paper.

The Flow of Water in Irrigation Channels (68350 D). George Henry Ellis. Tables and charts. 3000 w. A S C E, Pro—Feb., 1916. Study of data. Coefficient of roughness.

Holland

De uitkomsten der onderzoekingen in verband met eventuele droogmaking van de Wieringermeer (70180 B). V. J. P. de Blocq van Kuffeler and F. K. Th. van Itersen. Ills. 16000 w. Ing—April 8, 1916. Results of investigation of plan to drain Wieringer sea.

Idaho

Experiments on the Economical Use of Irrigation Water in Idaho (70878 N). Don H. Bark. Ills. 57 pp. U S D A, Bul 339—April 21, 1916. Results of ex-

IRRIGATION AND RECLAMATION**Pumping**

periments to determine the quantities of water needed.

Irrigation

Methods and Cost of Making a Snow Survey for Irrigation System (72858). F. T. Cummings. Ills. 1800 w. E & C—Aug. 30 1916. Data of survey made in Wyoming.

Irrigation Systems

Some Principles Governing the Design and the Operation of Irrigation Systems (66624). 1500 w. Cn E—Dec., 1915. From report of S. G. Porter. Reference to Alberta.

Irrigation Works

Slow Rate of Utilization of Irrigation Works (72270). R. P. Teele. Ills. 2100 w. E N—Aug. 3, 1916. Analysis of unpublished census material.

Los Angeles

Engineering an Economic Feature of the Irrigation System of the Los Angeles Aqueduct—Construction Just Beginning (67065). Burt A. Heinly. Ills. 4000 w. E & C—Jan. 26, 1916. Distribution pipe line system and irrigation works for extensive project.

Louisiana

Irrigation, Navigation and Water Power Development Proposed for Southern Louisiana (68929). Welman Bradford. 1600 w. M Rd—March 16, 1916. Plan to utilize Red River.

Metering

See flow under *Measurement*.

Montana

Water for Prickly Pear Irrigation Project Raised 160 Feet with Financial Success (66150). Ills. 1200 w. E R—Dec. 4, 1915. Electrically pumped supply near Helena.

Nile

L'utilisation du Nil (67018 C+D). Jean Ott. 28 pp. P C Am—May-June, 1915. Utilization of Nile waters for irrigation.

North Carolina

Reclamation of Swamp and Overflowed Lands in North Carolina (69089). Joseph Hyde Pratt. Ills. 4500 w. M Rd—March 28, 1916.

Power Development

Power Development — Reclamation Service Projects (71303 N). Arthur Powell Davis. Ills. 2700 w. A El S—Apr. 27, 1916. Power resources of Minidoka, Boise, North Platte, Rio Grande, Shoshone, Iron Canyon, Flathead River, Columbia River, and Priest Rapids projects.

Pumping

Drainage Pumping (71680 A). Ills. 6000 w. A S M E, JI—July, 1916. Dis-

Consult Classification of the Index. See page 7.

Pumping**MATERIALS OF CONSTRUCTION****Aggregates**

cussion of W. B. Gregory's paper on the evolution of low-lift pumping plants.

Electricity Supplants Mesquite-Fired Boiler as Power Source for Pumps (69933). Ills. 1500 w. E R—April 29, 1916. Installation for a Texas irrigation project.

Land Drainage by Means of Pumps (66011 N). Ills. 59 pp. U S Dept of Agri, Bul 304—Nov. 19, 1915. Design, construction and cost of levees, ditches and pumping plant.

Variable-Speed Pumping Plant for a Drainage District (64685). Ills. 600 w. Eng News—Nov. 11, 1915. Chain drive from different-sized sprockets.

The Evolution of Low-Lift Pumping Plants in the Gulf Coast Country (70222 B). W. B. Gregory. Ills. 10000 w. A S M E, JI—May, 1916. Details of types of drainage plants, with results of tests.

The Design and Test of a Large Reclamation Pumping Plant (70223 B). G. C. Noble. Ills. 4000 w. A S M E, JI—May, 1916. In California.

Land Drainage by Means of Pumps (66436 N). S. M. Woodward. 59 pp. Ills. U S D A, Bul 304—Nov. 19, 1915. Data from investigation.

See also same heading under **ELECTRICAL ENGINEERING, Power Applications.**

Relief Gates

Two Relief Gates Considered for Handling Cross-Canal Flood Waters. (66921). Joseph Jensen. Ills. 2000 w. E R—Jan. 1, 1916. Experimental installations to determine type to be adopted.

Rights-of-Way

Rights-of-Way for Irrigation Works Across Government Land (67920). Leonard Lundgren. From address before

Oregon Cong. 1000 w. W E—Feb., 1916. Steps for obtaining such.

Run-Off

The Run-Off Problem in Draining Irrigated Lands (66744). C. G. Elliott. 800 w. E & C—Dec. 22, 1915. Determining amount of water applied and its distribution.

Structures

Comparison of Wood and Concrete for Use in Irrigation Structures (69469). S. T. Harding. 3000 w. E & C—April 12, 1916. Cost, life, conditions affecting choice.

Sudan

Irrigation in the Sudan (65639 A). 1400 w. Engr, Lond—Oct. 22, 1915. Recent progress and proposed schemes.

Tile Drainage

Tile Drainage by Day Labor and by the Rod (68666). Ills. 1800 w. E N—March 9, 1916. Along Mississippi River.

Trenching Machinery

See same heading under *Construction.*

Waste Lands

Progress in Reclaiming Waste Lands in West Tennessee (73902 N). R. S. Maddox. Ills. 2000 w. R T—Oct., 1916. Account of methods and work.

Water Duty

Notes on the Duty of Water (67478 A). J. W. Beardsley. 2000 w. C C E—Jan., 1916. Area to be developed under given water supply, with special reference to Porto Rico.

Wells

Pumping Water for Irrigation (70768). Louis Schmeer. 1500 w. E & C—May 31, 1916. Serial. 1st part. Brief outline of the history of wells and movement of ground water.

MATERIALS OF CONSTRUCTION**Aggregates**

Screening and Washing Plants for Supplying Clean and Well Graded Aggregate (65733). Ills. 4000 w. Con-Cem Age—Nov., 1915. Describes successful plants.

A New Form of Specifications for Concrete Aggregates (71462 N). Cloyd M. Chapman. 7 pp. A S T M—June, 1916. Based on tests of concrete at age of 28 days.

The Specific Gravity of Non-Homogeneous Aggregates (71443 N). Prevost Hubbard and F. H. Jackson, Jr. Ills. 24 pp. A S T M—June, 1916. Investigation of methods.

Concrete Aggregates: Classification, Sources, Physical Condition, Requirements (66503). William M. Kinney and Duff A. Abrams. 4000 w. C C A—Dec., 1915. Serial, 1st part.

Requirements for Acceptance of Concrete Aggregates Based Upon Standard Tests (67175). Ills. 3500 w. E R—Jan. 8, 1916. Methods for continuous sampling and testing of concrete.

Practical Selection of Aggregates for Concrete (68150). R. J. Borhek. 1500 w. E & C—Feb. 16, 1916. Notes from 14 years' experience with various proportions.

Consult Classification of the Index. See page 7.

Asphalt**IRRIGATION AND RECLAMATION****Concrete**

Gravel as an Aggregate for Concrete (69444 A). H. H. Schofield and Charles C. Brown. 2500 w. Mun E—April, 1916. Study of data.

Asphalt

Progress in Asphalt Refining; with Notes on Mexican Asphaltic Crudes (67106). Leroy M. Law. Abstract of paper read at Worcester, Mass. 1800 w. Cn E—Jan. 6, 1916. Evolution of refined asphalts.

Chemistry, Manufacture, Transportation and Control Testing of Asphaltic Materials (71621). H. B. Pullar. Address at Columbia Univ. 2500 w. B R & S—July, 1916. Asphaltic materials of a compound nature.

Asphalt—Its History, Manufacture and Uses (73604 N). Charles Ekstrand. 16 pp. B'klyn Engrs' Club—1916.

Asphalt Shingles

Asphalt Shingle Question in Boston (73995 A). Ills. 1500 w. S f E—Oct., 1916. Report to the Mayor of Boston by building commissioner O'Hearn, with tests and analyses of asphalt shingles.

Balsa Wood

The Properties of Balsa Wood (70635 D). R. C. Carpenter. Ills. 4500 w. A S C E, Pro—May, 1916. Lightest wood known. Its microscopical structure; tests of strength, etc.

The Properties of Balsa Wood (72822 D). 2000 w. A S C E, Pro—Aug., 1916. Discussion of R. C. Carpenter's paper.

Brick

Bricks and Brick Making (73232 A). Ills. 900 w. Qry—Sept., 1916. Works and methods of the Burnley Brick and Lime Co., Ltd.

Sand-Lime Brick in 1915 (70263 N). Jefferson Middleton. 500 w. U S G S, II: 2—May 4, 1916. Progress.

Cement

The Pozzuolanic Properties of Meycauayan Volcanic Tuff (73197 N). Albert E. W. King. 2000 w. P J I S—Jan., 1916.

The Manufacture, Properties, and Testing of Portland Cement, with a Special Description of the Works of the Aberthaw and Bristol Channel Portland Cement Co., Ltd.; and a Use for Blast-Furnace Slag (68692 N). B. J. Day. 20 pp. I E S S, Trans—Feb., 1916. Discussion of paper.

The Manufacture of Portland Cement (68704 A). Howard Rhode. Lecture delivered Feb. 18, 1916. 3500 w. E S P, J I—Feb., 1916. History, processes.

The New Cement Specifications—The Changes Made and the Reasons Therefor (71821). R. J. Wig. 2000 w. E R—July 15, 1916. Explanation of requirements.

The Chemistry of Portland Cement (70244 A). Abstract of paper by G. A. Rankin. Ills. 4000 w. W E—May, 1916. Experiments on varying the constituents.

The Manufacture, Properties, and Testing of Portland Cement, with a Special Description of the Works of the Aberthaw and Bristol Channel Portland Cement Co., Ltd.; and a Use for Blast-Furnace Slag (70277 N). 1500 w. I E S S, Trans—April, 1916. B. J. Day's reply to discussion.

The Practical Chemistry and Modern Manufacture of Portland Cement (70225 B). George P. Dickmann. 4000 w. A S M E, J I—May, 1916.

Portland Cement (71064 B). George A. Rankin. Ills. 8500 w. F I, J I—June, 1916. Tricalcic silicate is the constituent that develops the greatest

Report of Committee C-1 on Cement (71433 N). Ills. 25 pp. A S T M—June, 1916. Proposed specifications and methods of tests.

The Manufacture, Properties, and Testing of Portland Cement, with a Special Description of the Works of the Aberthaw and Bristol Channel Portland Cement Co., Ltd.; and a Use for Blast-Furnace Slag (68161 N). B. J. Day. 2 plates. Ills. 35 pp. I E S S, Trans—Jan., 1916.

Die Verwendung der verschiedenen Zementarten in Kalibergbau (67056 B). A. Hoffmann. Ills. 3500 w. Glk—Dec. 25, 1915. Applications of Portland, magnesia and blast-furnace cements in the potash industry.

Cement in 1915 (72594 N). Ernest F. Burchard. 24 pp. U S G S, II: 16—Aug. 12, 1916. Production and shipments, prices, etc.

Coal-Gas Residuals

Coal-Gas Residuals and Their Application (69492 B). Fred. H. Wagner. 20 pp. F I, J I—April, 1916. Products and their uses.

Concrete

How Curing at Low Temperature Affects Concrete (65723). A. B. McDaniel. 1200 w. Eng Rec—Nov. 13, 1915. Reports results of tests.

Versuche zur Klarstellung der Wirkungsweise der Umschnürung bei Eisenbetonsäulen (65477 B). C. Bach. Ills. 1800 w. Z V d I—Oct. 30, 1915. Study of the efficiency of wrapped reinforcement in concrete columns.

Sand for Concrete and Cement Mortar Should Have "Jump" in Grading (66008). Robert H. McNeilly. Ills. 5000 w. Eng Rec—Nov. 27, 1915. New view, verified by tests.

Consult Classification of the Index. See page 7.

Concrete

MATERIALS OF CONSTRUCTION

Corrosion

Das Verhalten des Betons und Kunststeins gegen Geschosse (65440 B). P. Rohland. 1500 w. Gla Ann—Oct. 15, 1915. Experiments with concrete show its availability for military shields.

A Method of Making Wear Tests of Concrete (71463 N). D. A. Abrams. Ills. 8 pp. A S T M—June, 1916. Review of tests used.

Strength and Other Properties of Concretes as Affected by Materials and Methods of Preparation (71317). R. J. Wig, G. M. Williams and E. R. Gates. 172 pp. Charts. U S B S—Technologic Paper 58. Conclusions from 20,000 tests.

Characteristics Required of Concrete to Resist Action of Sea Water (70598). W. Walters Pagon. 700 w. E & C—May 24, 1916. Extract from report in Jour. Engrs' Club of Baltimore.

Factors Affecting the Strength and Proportioning of Gravel Concretes (73698). R. J. Borhek. 3000 w. E & C—Oct. 4, 1916. Deals with effect of quality, size and shape of aggregates.

Materials vs. Methods—Testimony of Moving Pictures in the Study of Concrete (66147). Nathan C. Johnson. Ills. 3500 w. E R—Dec. 4, 1915. Serial, 1st part. Evils of poor mixing and improper placing.

L'imperméabilisation des mortiers et l'huile anthracénique (68816 C + D). R. Feret. 22 pp. P C An—July-August, 1916. Experiments in the use of anthracene for waterproofing mortar.

Reinforced-Concrete as Applied to Waterworks Construction (68905 A). Charles F. Marsh. Abstract of paper before Concrete Inst. 1500 w. S M C E—Feb. 25, 1916. Chief uses.

Experiences sur l'action du frettage dans les colonnes de béton armé (68838 B). A. Goupil. Ills. 1000 w. Gn Cv—Feb. 26, 1916. Effect of helical reinforcement in columns.

Concrete Flows Under Sustained Load (68575). Earl C. Smith. 1500 w. E R—March 4, 1916. Results of tests.

Concrete Strength Not Result of Aggregate Strength (68663). Thomas Hendrick. Ills. 1600 w. E N—March 9, 1916. Tests

Does Alkali Disintegrate Concrete? (68569). 800 w. E R—March 4, 1916. Preliminary conclusions.

I Progressi Delle Norme per l'esecuzione delle opere in cemento Armato (74208 B). 4500 w. M T—Aug. 30, 1916. Discussion of latest specifications for reinforced concrete with reference to European practice.

Dichtungs- und Schutzmittel für Zementmörtel und Beton (67714 B). Paul

Herrmann. Ills. 1200 w. B u E—Jan. 4, 1916. Laboratory experiments on materials suitable for lining and protecting concrete and mortar.

Ueber den Widerstand gegen die Schlag- und Sprengwirkung der Geschosse und Erläuterung einiger zweckmässiger Bewehrungen zum Schutze gegen Brisanzgranaten (67713 B). Erich Brentrup. Ills. 2500 w. B u E—Jan. 4, 1916. Facts in regard to resistance of reinforced concrete to impact and explosion of shots and best methods of reinforcement to resist explosive shell.

The Strength of Concrete as Influenced by the Duration of Mixing (68126 B). H. H. Scofield. 2000 w. Ind Eng Soc—1915.

Strength and Other Properties of Concretes as Affected by Materials and Methods of Preparation (71863 A). R. J. Wig, G. M. Williams and E. R. Gates. Ills. 170 pp. U S B S, Tech paper 58—June 20, 1916. Results of many investigations and tests.

Life of Concrete Structures (71653). Bertram Blount. 1400 w. Cn E—July 6, 1916. Probable life, from the standpoint of an analytical chemist.

Copper-Steel

New Research in Corrosion Resistance (68649 A). D. M. Buck and J. O. Handy. Ills. 6000 w. J I E C—March, 1916. Further experiments.

Corrosion

Recent Developments in the Study of Corrosion of Concrete Buildings and Pipe Lines (68885 N). Morgan B. Smith. Ills. 21 pp. A S R E J—March, 1916. With discussion.

Corrosion Tests on Iron and Steel (68771 N). J. L. Campbell. Ills. 1500 w. A R E A, Bul—Jan., 1916. For water service committee.

The Corrosion of Metals: Ferrous and Non-Ferrous (71404 N). Ills. 100 pp. Trans Faraday Soc—April, 1916. General discussion, introduced by Sir Robert Hadfield. Physical and Mechanical Factors in Corrosion, by Cecil H. Desch; Relative Corrodibilities, by J. Newton Friend; Experiments on the Influence of Composition upon the Corrosion of Steel, by Leslie Aitchison; Note on the Corrosion of Iron and Steel, by S. Whyte; The Zinc-Copper Couple Hypothesis of Brass Corrosion, by Arnold Philip; Corrosion of a Solid Solution—70/30 Brass, by W. E. Gibbs; Demonstration of the Cumberland Electrolytic Process for Preventing Corrosion of all Metals Immersed in Liquids, by Elliott Cumberland; with general discussion.

Consult Classification of the Index. See page 7.

Corrosion

MATERIALS OF CONSTRUCTION

Gravel

The Corrosion of Metals (66692 A). 3500 w. Eng—Dec. 10, 1915. Editorial review of discussion before Faraday Society.

Metals in Structural Engineering: Their Wastage by Corrosion (73976 A). W. H. Maxwell. 3500 w. C E M—Oct., 1916. Summary of conclusions as to durability of metals subject to corrosion.

The Corrosion of Metals: Ferrous and Non-Ferrous (67249 A). 4000 w. Mch E—Dec. 31, 1915. General discussion at meeting of Faraday Society.

The Relative Corrodibilities of Iron and Steel (66694 A). J. Newton Friend. 3500 w. Enr—Dec. 10, 1915. Contribution to general discussion before Faraday Society, Dec. 8, 1915.

Third Report of the Corrosion Committee of the Institute of Metals (69849 N). William E. Gibbs, Richard H. Smith, and Guy D. Bengough. 127 pp. Inst Met—March 29, 1916.

Corrosion and the Engineer (69668 N). W. H. Walker. 5 pp. A E I S—April, 1916. Note on theory.

The Effect of Rust upon the Corrosion of Iron and Steel (69645 N). James Aston. 16 pp. A E I S—April, 1916. Discussion of theories.

The Prevention of Corrosion in Pipe (69946 D). F. N. Speller. Ills. 6000 w. A S H V E, JI—April, 1916. Details of tests. Also discussion.

Rust (70343 A). J. F. Springer. 2000 w. Mch W—April 28, 1916. Prevention and removal.

The Influence of Carbon and Manganese Upon the Corrosion of Iron and Steel (70536 N). Robert Hadfield and J. Newton Friend. 4500 w. Ir & St Inst—May, 1916. Research.

The Theory of the Corrosion of Steel (70537 N). Leslie Aitchison. Ills. 4500 w. Ir & St Inst—May, 1916. Theories and conclusions from investigations.

Sull' Irruginimento Del Ferro Nel Cemento Armato (72784 B). G. Gianoli. 1800 w. Ind—July 27, 1916. Review of opinions on the subject of corrosion of steel in reinforced concrete.

Creosoting

Creosoted Piling and Poles (71242 N). Frank W. Cherrington. Ills. 1800 w. A W-P A—Jan., 1916. Shows prolonged life of creosoted piling.

Methods of Creosoting Douglas Fir Timbers (71243 N). O. P. M. Goss, with discussion. Ills. 3000 w. A W-P A—Jan., 1916. Past and present methods.

Vacuum Process in Creosoting (71244 N). John D. Isaacs. 900 w. A W-P A—Jan., 1916. Experience of S. Pacific Co.

Drain Tile

Report of Committee C-6 on Drain Tile (71434 N). Ills. 19 pp. A S T M—June, 1916. Proposed specifications.

Tests of Effect of Method of Bedding Upon the Supporting Strength of Drain Tile and Sewer Pipe (69908). N. J. Schlick. Extract from paper before Iowa Drainage Assn. Ills. 2500 w. E & C—April 26, 1916. Results.

Explosives

The Use of Explosives (68155 A). Harrison Souder. 3500 w. E S P, JI—Jan., 1916. Kinds and care.

See same heading under MINING & METALLURGY, Mine Operation.

Fire Brick

Fire Brick for the Lime Kiln (73350). W. H. Kelley. 1500 w. N L M A—Aug., 1916. Application of silica brick to different types of lime kilns using various fuels.

Fire Clays

Properties of Some European Plastic Fire Clays (73351). A. V. Bleiningner and H. G. Schurecht. 32 pp. U S B S, Tech paper 79—Aug. 24, 1916. Study of European fire clays as a basis of comparison for American materials.

Fire Resisting

Investigation of Fire Resisting Materials Particularly as Related to Limestone Concrete (73421 N). Walter A. Hull. 13 pp. N L M A—Aug., 1916. Behavior of materials under fire.

Floors

An Investigation of Composition Flooring (72334 N). R. R. Shively. 4000 w. JI I & E C—Aug. 1916. Investigation at Mellon Institute, Pittsburgh.

Forest Products

Utilizing Waste Forest Products in Amazing Variety and Extent (72265). Ills. 1500 w. M Rd—Aug. 3, 1916. Outlines work at the Forest Products Laboratory at Madison, Wis.

Framing

Timber Framing (70981). Henry D. Dewell. Ills. 5500 w. W E—June, 1916. Serial, 1st part. First of five articles. General introduction; specifications for grading; unit stresses and strengths.

Grading

The Grading Industries (67317). Edward S. Wiard. Ills. 5500 w. M & C E—Jan. 15, 1916. Serial, 1st Part. Mechanical problems in sizing, classifying, etc.

Gravel

Sand and Gravel Washing and Grading Plant (66738). C. B. Breed. Ills. 1500 w. E N—Dec. 23, 1915. Served by dragline scraper.

Consult Classification of the Index. See page 7.

Hydrated Lime

MATERIALS OF CONSTRUCTION

Paving Brick

Hydrated Lime

Improving Concrete by the Use of Hydrated Lime (66407 A). 1800 w. Mun E—Dec., 1915. Experience and successful uses.

Internal Stress

Il metodo sperimentale del prof. E. G. Coker per determinare gli sforzi interni nei materiali da costruzione mediante la luce polarizzata (67777 C). Luigi Luiggi. 5 pp. S I A I An—Jan. 10, 1916. Discussion of Coker polarized light method for determining internal stresses in materials.

Iron Protection

Notes on the Preservation of Ferric Structures (73339 A). 4000 w. E C B, JI—Sept., 1916. Systems of protection.

Iron Scale

Removing Iron Scale by Pickling; Theory vs. Practice (65521). Carl Hering. 1800 w. Met & Chem Engng—Nov. 1, 1915. Present method wrong in principle. Results with Reed electrolytic process.

Laboratory

The United States Forest Products Laboratory (74025). Ills. 1500 w. R A G—Oct. 20, 1916. For studying timber preservation, etc.

Lime

The Use of Hydrated Lime in Concrete (69891 A). H. E. Wiedemann. 14 pp. E C St L, JI—March-April, 1916. Opinion of experts, favorable to use.

Magnesia in Limestone (69931 N). G. F. Loughlin. 11 pp. N L M A—March, 1916. Different theories of the geological processes.

Chemically Correct Hydrate of Lime On a Commercial Basis (72735 N). W. Crow. Ills. 8 pp. N L M A, Bul 14—July, 1916. The process and the Schaffer continuous lime hydrator.

Lime in 1915 (72736 N). G. F. Loughlin. 20 pp. U S G S, II: 19—Aug. 19, 1916. Production, uses, etc.

Manufacture of Lime in the Philippine Islands (73569 N). L. W. Thurlow. Ills. 1000 w. P JI S—May, 1916. Investigations to encourage the local industry. Best deposits and type of kiln best suited to the island conditions.

The Comparative Values of Different Kinds of Fuels for Lime Burning (73422 N). W. E. Emley. 1800 w. N L M A—Aug., 1916. Economy demands the control of products of combustion.

Lime for Chemical Industries in the South (73145 A). G. F. Loughlin. 1500 w. M Rd—Sept. 14, 1916. The inexhaustible supply of limestone and the uses of lime.

How Lime Can Be Re-established In the Plaster Field (70877). William C. Hay.

11 pp. N L M A—April, 1916. Advantages of an improved mortar plant.

The Importance of Lime in Agriculture (71185). G. J. Wilder. 2000 w. N L M A—May, 1916. Importance of lime to crop production.

Lumber

Hints for the Ordering of Lumber (66587). Abstract of paper read at Albuquerque, N. M. T. O. Ward. 1000 w. R A G—Dec., 17, 1915. Suggestions for the purchaser.

Oils

Refining Vegetable and Animal Oils (71063 B). Charles Baskerville. 4500 w. F I, JI—June, 1916. Process based on scientific principles.

Oxy-Acetylene

Origin and Manufacture of Oxy-Acetylene (72237 A). Ills. 2000 w. R & L E—Aug., 1916. Means and methods for use.

Paints

Rules for the Safe Handling of Paints and Oils (68679 A). J. W. Gibbons. 1500 w. R M E—March, 1916. Characteristics and precautions.

Paint (65524). G. B. Heckel. 6000 w. Address before Nat. Exp. of Chem. Ind. Met & Chem Engng—Nov. 1, 1915. Components and manufacture.

A Study of the Effect of Storage on Mixed Paints (73815 B). E. E. Ware and R. E. Christman. 4500 w. JI I & E C—Oct., 1916. Experimental study and conclusions.

Structural Steel Paint Values and Their Determination (71936 B). E. Booth. 1500 w. M E—1916. Discusses report issued by A. S. T. M.

Effects of Certain Pigments on Linseed Oil (69756 N). E. W. Boughton. 14 pp. U S B S, tech paper 71—April 13, 1916. Effects of storage and of certain pigments.

The Painting of Iron and Steel (71071 A). James Scott. Ills. 1000 w. R E—June, 1916. New suggestions. One coat claimed to give better protection than two or more.

Report of Committee D-1 on Preservative Coatings for Structural Materials (71435 N). Ills. 40 pp. A S T M—June, 1916. On testing of paint vehicles. linseed oil, paint thinners, shellac, etc.

Patented Materials

How Shall Patented Materials or Processes in Public Works Be Handled? (65338). 4500 w. Eng Rec—Oct. 30, 1915. Daniel B. Luten discusses S. Whinery's article, and latter replies.

Paving Brick

Some Comparative Tests of the Wearing Qualities of Paving Bricks, Concrete, Mortar, and Neat Cement (72331 A). F.

Consult Classification of the Index. See page 7.

Piles

L. Roman. Ills. 1500 w. Mun E—Aug., 1916. Tests, results and conclusions.

Some Comparative Tests of Wire-Cut-Lug and Repressed Paving Brick (71655). William A. Goss. 1500 w. E C—July 5, 1916. Tests to determine what effect the change of structure has on the quality.

Piles

Experience with Protected Timber Piles in Tropical Waters, at San Juan, Porto Rico (65849 A). J. P. Carlin. Ills. 1500 w. Cornell Civ Engr—Nov., 1915. Causes of failure of cement-coated piles.

Pipe Joints

Joints for Wrought-Iron and Steel Pipe (65950). R. S. Lord. Ills. 2000 w. Eng News—Nov. 25, 1915. Development of present commercial types.

Railroad Materials

Important Work of Bureau of Standards (67420 A). 2500 w. I A—Jan. 20, 1916. Investigating causes of failures and development of improved processes. See Materials under RAILWAY ENGINEERING, *Permanent Way and Buildings*.

Raw Materials

Utilizing Our Raw Materials at Home (73135 A). Joseph Hyde Pratt. 3500 w. M Rd—Sept. 14, 1916. Suggestions for utilizing raw products instead of shipping them to outside points.

Red Lead

Why Highly Oxidized Red Lead is Superior (72948). G. W. Thompson. 2000 w. M & E W—Sept. 2, 1916. Its value for the protection of iron and steel.

Reinforcement

Patent for Arch Reinforcement Declared Valid (68322). Ills. 2000 w. E R—Feb. 26, 1916. Historical sketch; Thacher patent.

Road-Building Rock

The Results of Physical Tests of Road-Building Rock (72353 N). Prévost Hubbard and Frank H. Jackson, Jr. 100 pp. U S D A Bul. 370—July 20, 1916.

Road Materials

See same heading under *Roads and Pavements*.

Rubber

Rubber from Tree to Factory (66507 A). Walter C. Mullett. 1800 w. C R C—Nov. 12, 1915. Brief account of gathering and preparation.

Sewer Pipe

Report of Committee C-4 on Clay and Cement Sewer Pipe (71449 N). 45 pp. A S T M—June, 1916. Analytical data.

Slags

Utilization of Iron and Steel Works' Slags (70881 B). E. C. Brown, with discussion and correspondence. 44 pp. E S W P—Jan., 1916. Early and modern

MATERIALS OF CONSTRUCTION

Timber

methods of disposal, composition, uses, etc.

Stone

See same heading under MINING AND METALLURGY, *Minor Minerals*.

Straining Effects

The Effects of Straining Structural Steel and Wrought Iron (67597 D). Henry S. Prichard. Ills. 11000 w. A S C E, Pro—Jan., 1916. Changes; fatigue formulas and their applications, etc.

The Effects of Straining Structural Steel and Wrought Iron (69913 D). 2200 w. A S C E, Pro—April, 1916. Continued discussion of Prichard's paper.

The Effects of Straining Structural Steel and Wrought Iron (72768 D). Ills. 45 pp. A S C E, Pro—Aug., 1916. Continued discussion of Henry S. Prichard's paper.

Stucco

The Use of Stucco as a Means of Modernizing Old Buildings (71108). Ills. 2500 w. Crt—June, 1916. Details of the work.

The Use of Lime in Stuccos (72592 N). Alfred H. White. 21 pp. N L M A—June, 1916. Behavior of stuccos exposed to the weather.

See also Plastering, under *Construction*.

Tar Products

The Effects of Exposure on Tar Products (74031 B). Charles S. Reeve and Benjamin A. Anderton. Ills. 2500 w. F I, JI—Oct., 1916. A study.

Tars

The Development of Refined Tars for Use in Road Construction and Maintenance (66088). Philip P. Sharples. Read before Nat. Ex. of Chem. Ind. 2500 w. M & C E—Dec. 1 1915. Development of the whole industry.

Tile

Developments in Operation of Factory Making Structural Tile (71109). Harvey Whipple. Ills. 2000 w. Crt—June, 1916. Detroit factory.

Timber

Variation in Weight and Strength of Timber (67751 N). J. A. Newlin. 1500 w. St. Louis Lumberman. Conclusions from work at Madison Laboratory.

Report of Committee D-7 on Timber (71451 N). Ills. 25 pp. A S T M—June, 1916. Douglas fir timber; wooden paving blocks; and timber preservation.

Timber in Canada (65553). R. H. Campbell. 2000 w. Can Engr—Nov. 4, 1915. From paper at Int. Engng. Cong. Outlines supply in each province.

Report of Committee on Service Tests of Bridge and Structural Timber (67460 N). 8000 w. A W P A—Jan., 1916.

Consult Classification of the Index. See page 7.

Timber Preservation

MATERIALS OF CONSTRUCTION

Wood

Report of Committee on Specifications for the Purchase and Preservation of Treatable Timber (67459 N). 6500 w. A W P A—Jan., 1916.

Greenheart, Used in Panama Canal, Is a Timber with Exceptional Qualities (67083). A. K. Armstrong. 2500 w. E R—Jan. 29, 1916. Serial, 1st Part. From Demerara, has great strength, costly.

The Density Rule for the Grading of Select Structural Yellow Pine Timber (72365 A). John E. Rhodes. 1800 w. L E S, Pro—Aug., 1916. On its use for specification.

The Forest Resources of Newfoundland (70484 A). Daniel Morris, with discussion. 10500 w. R S A, JI—April 28, 1916.

Forest Service Proposes Douglas Fir Grading Rule (68057). 1500 w. E R—Feb. 12, 1916. Density rule.

Yellow-Pine Timber Graded Without Guesswork (68375). Hermann von Schrenk. 2100 w. E N—Feb. 24, 1916. New rule settles confused situation.

Test of Douglas Fir Bridge Stringers (69057 N). H. B. MacFarland. Ills. 187 pp. A R E A, Bul—Feb., 1916. Treated and untreated.

Report of Special Committee on Grading of Lumber (68769 N). Ills. 1000 w. A R E A, Bul—Jan., 1916. Recommendations.

Timber Preservation

Creosoting Douglas Fir Bridge Stringers and Ties without Loss of Strength (69615 N). O. M. P. Goss. Ills. 27 pp. Assn. Creosote Companies of Pacific Coast. Tests and methods recommended.

Creosoting Plant at Orrville, Ohio, Has Vertical Cylinders for Wood Blocks (68325). E. A. Sterling. Ills. 1500 w. E R—Feb. 26, 1916. Economizing in cost, labor and space.

Report of Committee XVII—On Wood Preservation (69053 N). Ills. 35 pp. A R E A, Bul—Feb., 1916. Water sampling in creosote; amount of preservative; test records.

Marine Borers from Wood Preserver's Standpoint (68949). L. F. Shackell. 3000 w. R A G—March 17, 1916. Requirements for protection.

Methods of Creosoting Douglas Fir Timber (67463 N). O. P. M. Goss. Ills. 2000 w. A W P A—Jan., 1916. Methods on Pacific Coast; outline of recent development.

Creosoted Piling and Poles (67464 N). Frank W. Cherrington. Ills. 2000 w. A W P A—Jan., 1916. Methods of treatment.

Quantity of Zinc Chloride per Tie or per Cubic Foot of Timber, and Method of Determining the True Strength of the Solution (67461 N). W. F. Goltra. 2000 w. A W P A—Jan., 1916. General discussion of practice.

Timber Treatment

Timber Preservation (71241 N). J. W. Kendrick. 8000 w. A W-P A—Jan. 1916. Phases of the work from the railway viewpoint.

Fungi Which Grow on Untreated Ties or Untreated Wood (71251 N). Dr. H. von Schrenk. Ills. 5500 w. A W-P A—Jan., 1916. The relation of fungi to treated and untreated wood.

Marine Borers from the Wood-Preservers' Standpoint (71248 N). Dr. L. F. Shackell, with discussion. 5000 w. A W-P A—Jan., 1916. Considered from economic standpoint.

Quantity of Zinc Chloride Per Tie or Per Cubic Foot of Timber, and Method of Determining the True Strength of the Solution (71247 N). W. F. Goltra, with discussion. 3000 w. A W-P A—Jan., 1916.

Report of Committee on Specifications for the Purchase and Preservation of Treatable Timber (71250 N). 6500 w. A W-P A—Jan., 1916.

Varnish

Determination of Volatile Thinner in Oil Varnish (71742 N). 1600 w. U S B S—June 21, 1916. Accuracy and convenience of different methods.

Wastes

Tremendous Possibilities in the Utilization of Wastes from Long-Leaf Yellow Pine (67488). A. D. Little. From a paper read before the Am. Inst. of Chem. Engrs. 2500 w. M Rd—Jan. 20, 1916. The numerous possible byproducts and their value.

Wireglass

Wireglass: Its Manufacture and Application (71429 A). Edward R. Hardy and Howard Chapman. 4000 w. Sf E—June, 1916. Manufacture; value in fire protection.

Wire Rope

Wire Cables of Various Types and Materials Tested by U. S. Bureau of Standards (65565). Ills. 1200 w. Eng Rec—Nov. 6, 1915.

Wood

Wood Waste and Other Pulpwoods Used in 1914 by United States Mills (71095). Henry E. Surface. 2000 w. M & C E—June 15, 1916. Statistics.

Some Notes on Timber Construction and Some Examples of Early Timber Bridges (73605 N). Bernt Berger. Ills.

Consult Classification of the Index. See page 7.

Arches

20 pp. B'klyn Engrs' Club—1916. Care necessary in designing.

Wood Block

Treated Wood Block for Factory Flooring and Miscellaneous Uses (71252 N). C. H. Teesdale, with discussion. 9000 w. A W-P A—Jan., 1916. Methods of manufacture, results in service, etc.

Treated Wood Block for Factory Flooring and Miscellaneous Uses (67468 N). C. H. Teesdale. 2500 w. A W P A—Jan., 1916. Methods of manufacturing

MEASUREMENT

Beams

and laying; results in service; tabulated reports and records.

Wood Pipe

Proper Methods of Laying Wood Pipe (69964). John H. Curzon. Ills. 1200 w. Cn E—April 27, 1916. Uses.

Wood Waste

The Utilization of Wood Waste (67642). Arthur D. Little. 3500 w. M & C E—Feb. 1, 1916. Read before Am. Inst. of Chem. Engrs. Value; possible uses.

MEASUREMENT

Arches

Design of Masonry and Concrete Arches (69016 A). R. J. Williams. Ills. 2500 w. S M C E—March 3, 1916. Study of line of pressure.

Considerazioni sulla teoria dell'arco elastico incastrato agli estremi (68854 C). Aristide Giannelli. Ills. 10 pp. S I A I An—Feb. 16, 1916. Serial, 1st part. Mathematical examination of theory of elastic arch with fixed ends.

Stresses in Ferro-Concrete Arches (69319 A). 800 w. Eng—March 17, 1916. Simple method given by M. Mœnager, in *Le Génie Civil*.

The Design of Arches (65804 N). W. E. Lilly. 13 pp. Plate. Inst Civ Engrs of Ireland, Trans—Vol. XLI. Application of the catenary of uniform strength.

Some Notes on the Hydrostatic Curve and Its Application to the Theory of Stability of the Elliptic Masonry Arch (65801 N). J. T. Jackson. 23 pp. Inst Civ Engrs of Ireland, Trans—Vol. XLI. Theory and applications.

The Mathematical Theory of the Elastic Arch (71983 B). Willis Whited. 74 pp. E S W P, Pro—May, 1916. Some of the methods for determining stresses.

Barometers

Aneroid Barometers for Aviators (66493). P. Richard Jameson. 1200 w. C A M—Dec., 1915. Errors and corrections.

Beams

Diagrams for the Design of Reinforced Concrete T Beams (71478). M. A. Drucker. 900 w. E & C—June 28, 1916. Diagrams, their construction and use.

Strength of Webs of I-Beams and Girders (71762 N). Herbert F. Moore and W. M. Wilson. Ills. 45 pp. U I, Bul, No. 86—May 8, 1916. Report of tests made to study web strains.

The Web Strength of I-Beams and Girders (71508 B). H. F. Moore, with discussion. Ills. 6500 w. W S E, JI—March, 1916. Tests and results.

Elastic Curves and Influence Lines Simplify Analysis of Beams (66611). J. P. J. Williams. Diagrams. 4000 w. E R—Dec. 18, 1915. Graphical diagrams for deflections and reactions.

The Moment Diagram and Its Relation to the Reinforcement in a Concrete Beam (68293 A). S. C. Hollister. Diagrams. 2500 w. Wis E—Feb., 1916. Placing reinforcement from moment diagrams.

Bending Moment in Continuous Reinforced-Concrete Beams (68370). Raymond J. Roark. Ills. 1200 w. E N—Feb. 24, 1916. Two cases assumed; maximum moments computed.

The Bending and Torsion of Beams of Commercial Section (67933 A). E. G. Ritchie. 2500 w. Eng—Jan. 21, 1916. Serial, 1st part. Investigation of relation between longitudinal and transverse rigidity, and of accuracy in calculations.

Die wahre Grösse des Trägheitsmoments im Eisenbetonbalken (68880 B). Fritz v. Emperger. Ills. 3000 w. B u E—March 6, 1916. Discussion of moments of inertia in reinforced-concrete beams.

Graphical Analysis of Continuous Beams by the Use of the Principle of Continuity (72495). Cyril Provo Hubert. Ills. 1800 w. W E—Aug., 1916. Simple method for stress calculation.

Statische Untersuchung durchbrochener Wandträger in Eisenbeton (72817 B). S. Kasarnowsky. Ills. 1000 w. S B—Aug. 5, 1916. Mathematical expressions for static loading of special design reinforced concrete beams for a large public building.

Tests on the Shearing Resistance of Reinforced Concrete Beams (72359 N). E. Brown, H. M. MacKay and C. M. Morsen. 15 pp. C S C E—April 22, 1915. Results of tests.

New Formulas and Diagrams Give Deflections of Beams Under Any Loading (67293). Charles A. Ellis. 1000 w. E R—Jan. 15, 1916. Application of area-

Brick Testing

moment method; diagram for facilitating computations.

Graphical Treatment of Elastic Ribs (67477 A). C. S. Whitney. Ills. 2000 w. C C E—Jan., 1916. Simple method for drawing to scale the elastic curve for any rib or beam under any load.

Reinforced Concrete T Beams (67521 A). E. G. W. Montgomery. Diagrams. 1200 w. S M C E—Jan. 7, 1916. Two methods; examples.

The Design of Reinforced Concrete Tee-Beams (67209). H. Devereux. 600 w. W E—Jan., 1916. Rules and diagram for calculation.

Brick Testing

Spherical Bearings versus Flat Plates in Crushing Tests on Bricks (65763 A). E. L. Baker and Alex. F. Suss. A thesis. Ills. 1200 w. Assn Engng Soc., Jour—Oct., 1915. Tests and conclusions as to best method.

Bridge Stresses

A Study of Working Stresses for Bridge Structures (68112 N). Ills. 8000 w. A R E A, Bul—Nov., 1915. Impact, secondary stresses, working stresses for tension members.

Temperature Stresses in a Series of Spans (68352 D). Tresham D. Gregg. Ills. 2500 w. A S C E, Pro—Feb., 1916. Solution by method of least work and Castigliano theorem.

The Advantage of a Combined Use of Tables and Formulas in the Computation of Bridge Stresses (69762 B). R. P. V. Marquardsen. Ills. and plate. 18 pp. W S E, JI—Jan., 1916. Simple moment table; formulas, and examples.

Bridge Trusses

Sul Rafforzamento Indiretto delle travi principali dei ponti in ferro (72790 B). Ettore Lo Cigno. Ills. Serial, 1st part. 2300 w. M T—July 10, 1916. Mathematical treatment of the strength of bridge trusses.

Bucket Pins

Testing of Dredge Bucket Pins (72711). Ralph A. Young. Ills. 1800 w. E & M J—Aug. 26, 1916. Methods of testing and objects to be attained.

Catenary

Ueber die Kettenlinie (66235 B). A. Kiefer. Ills. 1200 w. S B—Nov 27, 1915. Calculation and characteristics of the catenary.

Cement Testing

Simple Cement Testing (65321). E. H. Bonnet. 1300 w. Coal Age—Oct. 30, 1915. Methods of procedure.

Charts

Logarithmic Plotting of Alignment Charts for Additive Expressions (73153 N). Crofton Edward Pym Sankey. 20

MEASUREMENT

pp. I C E, Paper No. 4154—1916. Investigation to design an alignment chart consisting of three parallel straight lines, that will read a relationship of the additive form, $a + b = c$, the variables being plotted logarithmically.

Diagrammatic Statistics for Municipal Engineers (73006 A). Reginald Brown. Charts. 3000 w. S M C E—Aug. 18, 1916. Read before Inst. of Munic. & Co. Engrs. Showing how information can be conveyed pictorially.

Columns

Progress Report of the Special Committee on Steel Columns and Struts (66730 D). Ills. 2500 w. A S C E—Dec., 1915.

Combined Fire and Load Tests of Building Columns (66358). Ills. 1800 w. E N—Dec. 9, 1915. Method of conducting.

Note sur l'équation différentielle de la ligne neutre et de la fibre moyenne d'une pièce chargée de bout (65982 B). Aurel A. Beles. Ills. 1000 w. Gen Civ—Nov. 13, 1915. Mathematical considerations of the bending of loaded columns.

Theoretical Determination of the Bending Moment and Deflection in Columns Subjected to Combined Bending and Compression (67801). David Kaplan. 1500 w. E & C—Feb. 2, 1916.

Neue Versuche Eisenbetonsäulen (68879 B). Max R. von Thullie. Ills. 2000 w. B u E—March 6, 1916. Some recent column tests on reinforced-concrete.

Column Tests

Large Columns of Carbon and Alloy Steels Fail Near Yield Points of Material (71560). J. H. Griffith and J. G. Bragg. Ills. 2000 w. E R—July 1, 1916. Tests made on half-size models.

Bracket-Loads on Columns of Constant Cross-Section (71725 A). William Dunn. Ills. 1500 w. Eng—June 23, 1916. Short study of effects.

Tests of Large Bridge Struts Reveal New Facts (71781). Ills. 1000 w. E N—July 13, 1916. Résumé of U. S. Bureau of Standards test on bridge columns.

Concrete

Pressure of Wet Concrete on the Sides of Column Forms (70463). A. B. McDaniel and N. B. Garver. Ills. 2800 w. E N—May 18, 1916. Experiments at Univ. of Ill.

An Investigation of Corrugated Culverts (70465). George L. Fowler. Ills. 4000 w. R A G—May 19, 1916. Hydrostatic and sand bed tests.

Time Tests of Concrete (72738 A). Franklin R. McMillan. 25 pp. E C St L—July-Aug., 1916. Data concerning be-

Cross Sectioning

havior of concrete when subjected to long time tests.

Economy of Continuity in Reinforced Concrete (69695). Raymond J. Roark. Ills. 2200 w. E N—April 27, 1916. In designing concrete girders for bridge work.

Berechnung eines Eisenbetonbinders unter Zugrundelegung der Formelsammlung und Anleitung zur Berechnung von Massivkonstruktionen aus Eisenbeton (68878 B). Ills. 2500 w. B u E—March 6, 1916. Formulas for reinforced-concrete trusses and massive construction.

Testing Concrete and Aggregates—Laboratory and Field Methods (65734). R. E. Goodwin. Ills. 3000 w. Con-Cem Age—Nov., 1915. Metho's of N. Y. Public Service Commission.

Cross-Sectioning

Autographic Cross-Sectioning by a New Instrument (70910). John Airey. Ills. 1800 w. E N—June 8, 1916. Application of planimeter methods.

Cubic Performance

"Cubic Performance" (66610). Leslie C. Frank. 1600 w. E R—Dec. 18, 1915. Defines term and explains use on sewage and water treatment.

Curves

A Practical Method of Tracing Some Useful Curves (69812 N). Arthur Hindhaugh Shield. 1500 w. J C E, No. 4098—1915. Sufficiently accurate for practical purposes.

Fitting Equations to Plotted Points (66468). J. B. Kommers. 1500 w. Wis E—Dec., 1915. Equations of the parabolic, hyperbolic, logarithmic, and the power series types of curves.

Drainage

Testing Various Soils for Drainage Properties (72272). John R. Haswell. Ills. 3600 w. E N—Aug. 3, 1916. Experiments.

Drain Tile

Tests of Effect of Method of Bending Upon the Supporting Strength of Drain Tile and Sewer Pipe (70479). N. J. Schlick. Ills. 3000 w. Cn E—May 18, 1916. From paper before Iowa Drainage Assn. Tests and results.

Earth Pressures

Earth Pressures: A Practical Comparison of Theories and Experiments (72763 D). L. D. Cornish. Ills. 10 pp. A S C E, Pro—Aug., 1916. A study.

Eccentric Loading

Eccentric Loading on Columns Discussed, Accompanied by Formulas and Table (72955). R. Fleming. Ills. 1200 w. E R—Sept. 2, 1916. Approximate methods and allowable fiber stresses.

MEASUREMENT

Evaporation

Is a Part Stronger Than the Whole? (65948). R. Fleming. Diagrams. 1800 w. Eng News—Nov. 25, 1915. Material loaded eccentrically is in theory strengthened by cutting away one side; author dissents.

Elasticity

A Practical Application of Optical Stress Analysis (70852 A). Ills. 2200 w. Eng—May 19, 1916. Methods of M. Mesnager, described in *Ann. des Ponts et Chaussées*, to solve problem in elasticity of reinforced concrete arch.

A Practical Application of Optical Stress Analysis (70852 A). Ills. 2200 w. Eng—May 19, 1916. Methods of M. Mesnager, described in *Ann. des Ponts et Chaussées*, to solve problem of elasticity of reinforced concrete arch.

English Measures

The Origin of English Measures of Length (67313 A). Charles M. Watson. 5500 w. R S A—Dec. 31, 1915. Reviews history of development and gradual correlation.

Estimates

What Constitutes an Engineer's Estimate? (69622 N). Adolph F. Meyer. 6 pp. C E S St P, Bul—April, 1916. Discussion.

Evaporation

A Study of the Depth of Annual Evaporation from Lake Conchos, Mexico (70642 D). 3000 w. A S C E, Pro—May, 1916. Continued discussion of paper by Duryea and Haehl.

A Study of the Depth of Annual Evaporation from Lake Conchos, Mexico (69915 D). 4800 w. A S C E, Pro—April, 1916. Continued discussion of paper by Duryea and Haehl.

A Study of the Depth of Annual Evaporation from Lake Conchos, Mexico (67603 D). 1500 w. A S C E, Pro—Jan., 1916. Continued discussion of the paper by Edwin Duryea, Jr., and H. L. Haehl.

A Study of the Depth of Annual Evaporation from Lake Conchos, Mexico (66726 D). Ills. 6000 w. A S C E—Dec., 1915. Discussion of paper by Edwin Duryea, Jr., and H. L. Haehl.

A Study of the Depth of Annual Evaporation from Lake Conchos, Mexico (68354 D). 5000 w. A S C E, Pro—Feb., 1916. Continued discussion of this paper by Duryea and Haehl.

A Study of the Depth of Annual Evaporation from Lake Conchos, Mexico (69082 D). 8000 w. A S C E, Pro—March, 1916. Continued discussion of paper by Duryea and Haehl.

Consult Classification of the Index. See page 7.

Flow**MEASUREMENT****Hydraulic Jump****Excavation**

Measurement Methods for Quarry and Open-Cut (67207). C. S. Galbraith. Ills. 2500 w. W E—Jan., 1916. Irregular excavations.

Filing System

Loose-Leaf Filing System for City Surveys. (72671). James M. Owens. Ills. 1300 w. E N—Aug. 24, 1916. System installed in San Francisco.

Floors

Tests Show How Loads Are Distributed on Reinforced-Concrete Slab Floors (65572). Ills. 3000 w. Eng Rec—Nov. 6, 1915. Effective width of slab determined.

Flow

Chemi-Hydrometry and Its Application to the Precise Testing of Hydro-Electric Generators (69908 D). 1600 w. A S C E, Pro—April, 1916. Continued discussion of Groat's paper.

Venturi Meter Developed for Accurate Measurement of Irrigation Water (69116). Alan A. Wood. Ills. 2500 w. E R—March 25, 1916.

The Automatic Volumeter (69080 D). Ills. 1000 w. A S C E, Pro—March, 1916. Continued discussion of Hopson's paper.

Chemi-Hydrometry and Its Application to the Precise Testing of Hydro-Electric Generators (66017 D). Benjamin F. Groat. Ills. 325 pp. Am Soc Civ Engrs, Pro—Nov., 1915. Measurement of quantities of fluids by chemical methods; errors and their elimination, etc.

The Alignment Diagram Applied to the Flow of Water in Uniform and Compound Mains (71836 A). D. Halton Thomson. 5000 w. S M C E—June 30, 1916. Read before Inst. of Water Engrs., London. New method of graphical representation.

Determination of Maximum Stream-Flow (70982). C. E. Grunsky. 1200 w. W E—June, 1916. Develops an expression for even the largest streams.

Practical Methods of Measuring Flowing Water (71981 B). C. O. Wisler. 4500 w. M E—1916. Methods employed.

Chemi-Hydrometry and Its Application to the Precise Testing of Hydro-Electric Generators (68356 D). 3000 w. A S C E, Pro—Feb., 1916. Continued discussion of Groat's paper.

The Saline Method of Water Flow Measurements as Used in the Acceptance Test of a Pumping Plant (67637 A). W. D. Peaslee. 4500 w. G E R—Feb., 1916. Method and examples.

Practical Methods of Measuring Flowing Water (71055). C. O. Wisler. 4500 w. E & C—June 14, 1916. Résumé of methods employed.

Bazin vs. Ganguillet and Kutter (74053). A. G. Hillberg. 1000 w. E R—Oct. 21, 1916. Peculiar relation between formulae commonly used for calculating flow of water.

Chemi-Hydrometry and Its Application to the Precise Testing of Hydro-Electric Generators (72765 D). 15 pp. A S C E, Pro—Aug., 1916. Continued discussion of the paper by Benamin F. Groat.

Flow of Water Into Wells; Approximate Theory (72421). N. Werenskiold. Ill. 1000 w. E N—Aug. 10, 1916. Formula for finding rate of flow, etc., from open wells.

Formula

Circular Mil Formula Derived (72473). 1000 w. Pwr—Aug. 15, 1916. How derived and transposed.

Frames

Calcul des cadres à angles considérés comme poutres continues (65421 B). E. Lacroix. Ills. 1200 w. Schw Bau—Oct. 9, 1915. Formulas for frames considered as continuous beams.

Gas Flow

On Some Proposed Electrical Methods of Recording Gas Flow in Channels and Pipes Based on the Linear Hot-Wire Anemometer (72369 B). Louis Vessot King. Ills. 3500 w. F I, JI—Aug., 1916. Advantages.

Gas Testing

Standard Methods of Gas Testing (72598 B). 190 pp. U S B S, Circ. 48—June 10, 1916. Accepted methods found satisfactory by experienced gas testers.

Girder Design

To Find Graphically the Position of Unit Load Giving Zero Stress in Any Web Member of a Girder (72537 A). John Edmonson. 700 w. Eng—July 28, 1916. Graphical construction giving position of load causing no stress.

Harmonic Analyzer

The Henrici Harmonic Analyzer and Devices for Extending and Facilitating Its Use (73360 B). Dayton C. Miller. Ills. 7800 w. F I, JI—Sept., 1916. Details of devices and methods.

Hydraulic Jump

The Hydraulic Jump, in Open-Channel Flow at High Velocity (66025 D). Ills. 5500 w. Am Soc Civ Engrs, Pro—Nov., 1915. Discussion of Karl R. Kennison's paper.

The Hydraulic Jump, in Open Channel Flow at High Velocity (67602 D). 3500 w. A S C E, Pro—Jan., 1916. Continued discussion of Karl R. Kennison's paper.

The Hydraulic Jump in Open-Channel Flow at High Velocity (66725 D). Ills.

Hydrography

3800 w. A S C E—Dec., 1915. Continued discussion of Karl R. Kennison's paper.

The Hydraulic Jump, in Open-Channel Flow at High Velocity (68358 D). Ills. 5000 w. A S C E, Pro—Feb., 1916. Continued discussion of Kennison's paper.

Hydrography

Instrument Plots Profiles of River and Harbor Beds (71979). Ills. 1000 w. E. R—July 22, 1916. Profilograph developed by Argentine engineer records soundings automatically.

Hydrographic Surveying in the Western Part of the New London, Conn., District (71965 B). E. W. Crowley. Ills. 2500 w. P M—July-Aug., 1916. Outlines modes of procedure and appliances.

Illinois

Chemical and Biological Survey of the Waters of Illinois (72590 N). Edward Bartow. Ills. 244 pp. U I, Bul—Jan. 10, 1916. Report for year ending Dec. 31, 1914.

Impact

On Impact Coefficient for Railway Girders (69788 N). Charles William Anderson, with abstract of discussion. 6 plates. 113 pp. I C E, No. 4106—April 13, 1915. Rules of government of India and their evolution.

Indeterminate Stresses

Welchen Einfluss übt der Grad der statischen Unbestimmtheit eines Systems auf dessen Querschnittsbemessung aus? (66206 B). G. Kaufmann. Ills. 5000 w. B u E—Nov. 3, 1915. Mathematical enquiry into influence on calculation of sections, of degree in which system is statically indeterminate.

Internal Stress

Gli sforzi interni nei materiali da costruzione, determinati mediante la luce polarizzata (68807 C). E. G. Coker. Ills. 16 pp. S I A I An—Feb. 1, 1916. Polarized light for analyzing internal stresses in materials of construction.

Polarized Light and Its Applications to Engineering (68925 A). E. G. Coker. (Abridged). Ills. 5000 w. Nt—Feb. 24, 1916.

Lattice Bars

Stresses in Lattice Bars of Channel Columns (68386). William Worth Pearce. 1500 w. Cn E—Feb. 24, 1916. Formula that agrees with test results.

Latticed Members

Note sur le flambage des pieces a treillis (67019 B). D. Mathieu. Ills. 1500 w. G C—Dec. 25, 1915. Formulas for buckling of latticed members.

Leveling

Spirit Leveling in Arkansas, 1896 to 1915, Inclusive (71957). R. B. Marshall.

MEASUREMENT**Piling**

48 pp. U S G S—Bul. 636. Primary leveling.

Precise-Level Survey of the City of Portland, Ore. (71782). W. P. Hardesty. Ills. 3300 w. E N—July 13, 1916. How a large city established permanent bench marks.

Spirit-Leveling in West Virginia, 1896 to 1915 Inclusive (71422). R. B. Marshall. 150 pp. U S G S—Bul. 632.

Spirit Leveling in Maine (70923). R. B. Marshall. 50 pp. U S G S—Bul. 633.

Logarithms

Extended Logarithms (67350 A). Arthur S. Little. 2000 w. JI Act—Jan., 1916. Serial, 1st part. Explanation of factoring principle, applicable to large numbers.

Loss of Head

Tests of Loss of Head in Strainers, Orifices and Sand (70583 N). Langdon Pearce. Ills. 1200 w. A W W A, JI—June, 1916. Experimental data.

Magnetic Variations

See Magnetism under ELECTRICAL ENGINEERING, *Electro-Physics*.

Mass Diagram

Mass Diagram for Power and Water Supply Computations (72673). W. L. Butcher. Ills. 2000 w. E N—Aug. 24, 1916. Extension of the "mass" diagram to more complex problems.

Meters

Meter Installation at Wilmington, Del. (73848). Ills. 1200 w. E & C—Oct. 11, 1916. Information concerning methods.

Meter Tests

Equipment Devised for Testing Water Meters Quickly in the Field (73077). W. T. McClenahan. Ills. 3000 w. E R—Sept. 9, 1916. Methods for checking accuracy without removing meters.

Metric System

The Metric System (74084 A). Arthur J. Price. 3500 w. S M C E—Oct. 6, 1916. Favoring adoption.

New Mexico

Spirit Leveling in New Mexico, 1902 to 1915, Inclusive (72732). R. B. Marshall. 100 pp. U S G S—Bul. 638.

Oil

See *Roads and Pavements*.

Oil Flow

Experiments on the Flow of Oil in Pipes (67550 A). Arthur C. Preston. Ills. 8000 w. U C J E—Dec., 1915. Experiments at Univ. of Colo. to obtain information for use in designing oil systems.

Piling

Formulas for Determining the Pressures on Piles Supporting Masonry (68933). J. R. Biedinger. 500 w. E & C—March 15, 1916. Determining spacing.

Consult Classification of the Index. See page 7.

Pipe Discharge**Pipe Discharge**

The Discharge from Vertical Pipes (70246 A). C. E. Grunsky. 500 w. W E—May, 1916. Chart. Formula, especially applicable to artesian wells.

Pipe Tests

Tests of Reinforced Concrete Pipe (71774). Joseph S. Lambie. Ills. 700 w. I T R—July 13, 1916. Tests made to determine maximum pressure sustained by pipe at various ages.

Plane Co-ordinates

A Method of Transforming Latitude and Longitude into Plane Co-ordinates (73357 B). Sturgis H. Thorndike, with discussion. 3000 w. B S C E, JI—Sept., 1916. Simple method.

Plasticity

The Compressive Method of Measuring Plasticity (69759 N). W. E. Emley. 1000 w. N L M A—March, 1916. Extension to include sand-carrying capacity.

Rainfall

The Rain-Gauge in Rainfall Computations (65706). E. A. Lees. From a paper before Munic. W. Wks. Assn., London. 1400 w. Can Engr—Nov. 11, 1915. Methods.

Recorder Shelter

Shelters for Automatic Water-Stage Recorders (73597 A). George J. Lyon. Ills. 600 w. G E R—Oct., 1916. Instructions recommended.

Reservoirs

Berechnung eines rechteckigen Eisenbeton-Reservoirs auf elastischer Unterlage (69601 B). S. Kasarnowsky. Ills. 1500 w. S B—Mar. 11, 1916. Calculating a rectangular reservoir of reinforced concrete supported on an elastic foundation.

Retaining Walls

A Fallacy in the Design of Retaining Walls (68010). Gilbert D. Fish. Ills. 1600 w. E N—Feb. 10, 1916. Error in theory.

Fallacies in Retaining Wall Design and the Lateral Pressure of Saturated Earth (68847 B). L. D. Cornish. Ills. 35 pp. P M—March-April, 1916. With discussion.

Riveted Joints

Riveted Joints Being Tested by Series of Simple and Accurate Mirror Extensometer (70376). Ills. 1000 w. E R—May 13, 1916. New method of applying apparatus to determine rivet slip.

Rivets

Stresses in Rivets Used in Direct Tension (68187). Ills. 1600 w. E N—Feb. 17, 1916. Analysis of stress conditions.

Safety Factors

Knickfestigkeit und Sicherheitsgrad (67048 B). Gümbel. Ills. 3000 w. Z V

MEASUREMENT

d I—Dec., 25, 1915. Problems in regard to breaking strength and the factor of safety.

Sea Level

Determinacion aproximada del nivel medio del mar y del plano de media marea baja (65495 A). Francisco Gaston. Ills. 7 pp. Soc Cub Ing Rev—Nov., 1919. Rules and tables for determining mean sea level and mean low tide in Cuba.

Secondary Stresses

Secondary Stresses (67525 A). 3000 w. Eng—Jan. 7, 1916. Editorial review of R. L. Manville's article in *Eng. News*.

Slabs

Method of Designing a Rectangular Reinforced Concrete Flat Slab, Each Side of Which Rests on Either Rigid or Yielding Supports (72769 D). 25 pp. A S C E, Pro—Aug., 1916. Continued discussion of A. C. Janni's paper.

Tests of Concrete Floor Slabs (70146 C). Almon H. Fuller, Charles C. Moore and Dolph E. Hooker. Ills. 97 pp. P N S E, Pro—Jan.-Feb., 1916. Three articles on tests of Seattle buildings, discussed together.

Test of Mushroom Flat Slab in Seattle Warehouse Shows High Local Stresses (70380). D. E. Hooker. Ills. 3000 w. E R—May 13, 1916. Extensometer measurements under live loads.

Method of Designing a Rectangular Reinforced Concrete Flat Slab, Each Side of Which Rests on Either Rigid or Yielding Supports (69916 D). 2000 w. A S C E, Pro—April, 1916. Discussion of Janni's paper.

Tests of Hollow-Tile, Flat-Arch Floor Slabs Show Effects of Concentrated Loads (69936). Clyde T. Morris. Ills. 1500 w. E R—April 29, 1916. Rod stresses measured; method of calculation design.

Plattenversuche des deutschen Ausschusses für Eisenbeton (67715 B). Hager. Ills. 1500 w. B u E—Jan. 4, 1916. Results of experiments of German Reinforced Concrete Commission on strength of slabs.

Method of Designing a Rectangular Reinforced Concrete Flat Slab, Each Side of Which Rests on Either Rigid or Yielding Supports (68351 D). A. C. Janni. Ills. 1000 w. A S C E, Pro—Feb., 1916.

Analysis and Tests Held to Show Advantages of New Flat-Slab Reinforcement (68059). Edward Sinulski. Ills. 3000 w. E R—Feb. 12, 1916. Serial, 1st part. Stress conditions; deflection contours.

Results of Some Tests to Determine the Load Distribution Through Reinforced Concrete Slabs (66821). Ills.

Consult Classification of the Index. See page 7.

Soil Pressure

2500 w. E & C—Dec. 29, 1915. To determine effective width.

Tests of Reinforced Concrete Flat Slab Structures (70875 C). Arthur N. Talbot and Willis A. Slater. Ills. 120 pp. U I, Bul, No. 84—Jan. 31, 1916. Results of tests.

Soil Pressures

An Apparatus for Determining Soil Pressures (71458 N). A. T. Goldbeck and E. B. Smith. Ills. 10 pp. A S T M—June, 1916. For measuring pressure under earth fills or against walls.

Cohesion in Earth: The Need for Comprehensive Experimentation to Determine the Coefficients of Cohesion (72767 D). 13 pp. A S C E, Pro—Aug., 1916. Continued discussion of William Cain's paper.

La Détermination Des Eléments Nécessaires au calcul de la poussée des terres (72815 B). 2100 w. Gn Cv—July 29, 1916. Calculation of earth pressures with reference to use of concrete in foundations.

Experiments on the Distribution of Vertical Pressure Through Sand. (67427). Melvin L. Enger. Ills. 1600 w. E & C—Jan. 19, 1916. Experimental work at the University of Illinois.

Cohesion in Earth: the Need for Comprehensive Experimentation to Determine the Coefficients of Cohesion (66721 D). William Cain. 3500 w. A S C E—Dec., 1915. Experiments.

Progress Report of the Special Committee to Codify Present Practice on the Bearing Value of Soils for Foundations (69078 D). Ills. 7000 w. A S C E, Pro—March, 1916.

Results of Some Tests to Determine the Distribution of Vertical Pressure Through Sand (68896). R. B. Fehr and C. R. Thomas. Ills. Abstract from Bul. and Penn. State College. 2500 w. E & C—March 29, 1916.

The Lateral Pressure and Resistance of Clay, and the Supporting Power of Clay Foundations (69793 N). Arthur Langtry Bell, with discussion. Ills. 104 pp. I C E, No. 4131—Jan. 12, 1915. Extension of Rankine's theory.

Cohesion in Earth: The Need for Comprehensive Experimentation to Determine the Coefficients of Cohesion (69910 D). 700 w. A S C E, Pro—April, 1916. Continued discussion of Cain's paper.

Spirit Leveling

Spirit Leveling in Georgia, 1896 to 1914, Inclusive (72352 N). R. B. Marshall. 50 pp. U S G S—Bul. 635.

Splices

The Strength of Clamped Splices in Concrete Reinforcement Bars (71441 N). E. L. Lasdier. Ills. 22 pp. A S T M—

MEASUREMENT

June, 1916. Tests to determine load the splice would resist.

Stays

A Method of Determining the Initial Tensions in Rope Stays Supporting Towers or Similar Structures (69798 N). William Edward Corrie. 1800 w. I C E, No. 4122—1915. For towers at wireless telegraph station.

Straining Effects

The Effects of Straining Structural Steel and Wrought Iron (69085 D). 5000 w. A S C E, Pro—March, 1916. Discussion of Prichard's paper.

Stream Measurement

Organization of the Hydrometric Survey (69963). From report by P. M. Sauder, G. H. Whyte, and G. R. Elliott. Ills. 1800 w. Cn E—April 27, 1916. Progress of stream measurements in Canada.

Field and Office Methods Employed by the Hydrometric Survey of Canada (70095). Ills. 4500 w. Cn E—May 4, 1916. Extract from report. Information on steam gauging.

Construction of an Unusual Relief Map (70601). Burt C. Heinly. Ills. 1200 w. E & C—May 24, 1916. Bureau of Water-Works of Los Angeles.

Spirit Leveling in Louisiana, 1903 to 1915, Inclusive (70632). R. B. Marshall. 90 pp. U S G S—Bul. 634.

Stresses

Practical Applications of Statically Indeterminate Constructions (71059 B). W. T. Holtappel. 1500 w. E C P, Pro—April, 1916. Methods of calculation.

The Effects of Straining Structural Steel and Wrought Iron (70638 D). 5500 w. A S C E, Pro—May, 1916. Continued discussion of Henry S. Prichard's paper. Constants and Diagrams for Repeated-Stress Calculations (71444 N). H. F. Moore and F. B. Sealy. 6 pp. A S T M—June, 1916. Supplementary to paper on "The Failure of Materials Under Repeated Stress."

Structural Steel

Errors in Structural Steel Designing (66342). Edward Godfrey. Ills. 2000 w. E & C—Dec. 8, 1915. Description.

Structures

See Researches under MECHANICAL ENGINEERING, Heating and Cooling.

Surveying

Observations in Government Land Surveys (73417 B). J. F. Mangold. 2000 w. Iowa Eng Soc—Feb., 1916. Difficulties due to inaccuracies.

A Simple Diagram for Reducing Tachometer Readings (72544 A). Frank R. Freeman. Ills. 500 w. Enr—July 28,

Surveying

MEASUREMENT

Tests

1916. Method of reducing readings made in the field.

The U. S. Coast and Geodetic Survey and the More Important Features of Its Activity (71428 A). John F. Pratt. Ills. 22 pp. P N S E, Pro—March-April, 1916. History and development; methods; work, etc.

Some Practical Notes on Mine Surveying (72559). W. F. Boericke. 2500 w. E & M J—Aug. 19 1916. Methods for flat deposits.

City Surveying (71775). John McNeal. 3500 w. Mun JI—July 13, 1916. Field and office-work methods.

Triangulation in California, 1913-1915 (71740 N). R. B. Marshall. 60 pp. U S G S—Bul 644-C. Field work.

Primary Traverse in Indiana and Michigan, 1913-1915 (73167 N). R. B. Marshall. 49 pp. U S G S—Bul. 644-F. Report of field work.

Primary Traverse in Iowa and Missouri, 1913-1915 (73168 N). R. B. Marshall. 42 pp. U S G S—Bul 644-G. Report of field work.

Primary Traverse in Louisiana and Mississippi, 1913-1915 (72887 N). R. B. Marshall. Ills. 10 pp. U S G S—Bul 644-I.

Spirit Leveling in Mississippi, 1901 to 1915 Inclusive (73162). R. B. Marshall. 70 pp. U S G S—Bul 639. Report of field work.

Spirit Leveling in South Dakota, 1896 to 1915 Inclusive (73164 N). R. B. Marshall. 90 pp. U S G S—Bul 643. Report of field work.

New Topographic Survey Methods for Rapid Work (66998). James H. Bonner and Frank E. Bonner. Ills. 2500 w. E N—Jan. 6 1916. Changes in methods for timber lands.

East River Tunnel Surveys (73722). C. M. Holland. Ills. 2100 w. E N—Oct. 5, 1916.

Economic Surveys of County Highway Improvement (73688 A). J. E. Pennybacker and M. O. Eldridge. Ills. 86 pp. U S D A, Bul 393—Oct. 23, 1916. Data showing comparative financial burdens.

Manitoba Hydrometric Survey (74182). Ills. 3500 w. Cn E—Oct. 26, 1916. Methods employed.

Spirit Leveling in Texas, 1896 to 1915, Inclusive (73762). R. B. Marshall. 240 pp. U S G S—Bul. 637. Work done.

Surveying, Past and Present (73607 A). Edward A. Reeves. Fothergill lectures. Ills. 9500 w. R S A, JI—Sept. 15, 1916. Serial, 1st part. Deals particularly with geographical surveying.

Photographic Surveying as an Aid to Town Planning (67673 B). H. E. Lance

Martin. Ills. 1800 w. I M C E, JI—Dec., 1915. Method; example.

Topographical Survey, Fort Sill Military Reservation (67746 N). D. H. Connolly. Ills. 25 pp. Prof Mem—Jan.-Feb., 1916. Methods in detail as employed here.

Notes on Tunnel Survey Work (68089). M. H. Marshall. Ills. 3500 w. Cn E—Feb. 10, 1916. General methods.

The Work of the United States Lake Survey Office, Detroit, Michigan (68846 B). Mason M. Patrick. Ills. 12 pp. P M—March-April, 1916. Character of surveying work carried on.

Adaptation of Modern Traverse Tables to Mine Surveys (69106). L. D. Tracy. 2500 w. Cl A—March 25, 1916. Special reference to Gurden's.

Unusual Methods Simplify Topographic Survey of Rough Wooded Area (68570). R. E. Davis and W. H. Rayner. 1800 w. E R—March 4, 1916. Tract mapped for \$3.34 per acre.

A Rapid Method of Contouring Plans in the Field (69805 N). Howard Kennedy Lamb. 500 w. I C E, No. 4116—1915. Instrument designed by D. L. Hutchison.

Circa una tavola pel calcolo della correzione di curvatura terrestre e refrazione atmosferica nelle differenze di livello (69621 B). Giuseppe Roccini. 2000 w. M T—Mar. 10, 1916. Tables for calculation of curvature and refraction in leveling.

Precise Levelling by the Geodetic Survey (69819). F. B. Reid. Maps. 3000 w. Cn E—April 20, 1916. Serial, 1st part. Review of work in Canada.

Photographic Surveying (65805 N). M. T. Ormsby. Ills. 50 pp. Inst Civ Engrs of Ireland, Trans—Vol. XLI. General description of instruments and methods, not, however, including stereoscopic apparatus.

Topographical Railway Traversing (65554). J. A. MacDonald. 1200 w. Can Engr—Nov. 4, 1915. Use of the stadia.

Distribution of the Magnetic Declination in the United States for January 1, 1915, with Isogonic Chart and Secular Change Tables (65884 N). Daniel L. Hazard. 15 pp. U S Coast & Geod Surv—No. 33.

Tensile Tests

Influence of Thickness on Tensile Tests (69477 A). G. B. Waterhouse. 1500 w. I A—April 13, 1916. How variations affect static properties of steel plates.

Tests

Road Board Laboratory Tests (73233 A). H. P. Maybury, R. E. Crompton, and

Consult Classification of the Index. See page 7.

Thermoelements

T. E. Stanton. 1500 w. S M C E—Sept. 1, 1916. Tests carried out in the road testing machine.

Thermoelements

Protected Thermoelements (70874 N). Arthur W. Gray. Ills. 800 w. U S B S, Sci paper 276—May 10, 1916. Details of a mounting for protecting from damage.

Topography

Combination of Plane Table and Transit for Topography (73200). Holbert T. Johnson. Ills. 1800 w. E N—Sept. 14, 1916. Plane table for field plotting and transit for angles and stadia.

Triangulation

Triangulation and Primary Traverse in Kentucky, Tennessee, and Arkansas, 1913-1915 (73169 N). R. B. Marshall. 12 pp. U S G S—Bul 644-H. Results of field work of the United States Geological Survey.

Triangulation and Primary Traverse in Texas, 1913-1915 (73171 N). R. B. Marshall. 75 pp. U S G S—Bul 644-P. Results of field work.

Triangulation and Primary Traverse in Washington, 1913-1915 (73172 N). R. B. Marshall. 9 pp. U S G S—Bul 644-Q. Results of field work.

Triangulation in Colorado, Utah, Idaho, Montana, and Wyoming (73166 N). R. B. Marshall. 140 pp. U S G S—Bul 464-D. Report of field work.

Triangulation in Nevada, 1913-1915 (73170 N). R. B. Marshall. 25 pp. U S G S—Bul 644-M. Results of field work.

Triangulation in Arizona and New Mexico, 1913-1915 (71423). R. B. Marshall. 12 pp. U S G S—Bul. 644-B.

A Direct-Reading Tacheometer (65802 N). H. H. Jeffcott. Plate. 40 pp. Inst Civ Engrs of Ireland, Trans—Vol. XLI. Account of an endeavor to improve tacheometric practice.

Some Points Generally Neglected in the Construction of Theodolites (65803 N). R. F. Waller. Plate. 21 pp. Inst Civ Engrs of Ireland, Trans—Vol. XLI. Improvements needed.

Specifications and Unit Costs for an Extensive Topographical Survey (72739 A). Henry Fox. 21 pp. E C St L—July-Aug., 1916. For Harris Co., Texas.

Triangulation and Primary Traverse in New York, New Jersey, and Pennsylvania, 1913-1915 (72836 N). R. B. Marshall. 24 pp. U S G S—Bul. 644-N. Results of field work.

Trusses

I. Deflection of Trusses (69766 B). E. H. Casper, and C. J. Kennedy. II. The

MEASUREMENT

Use of Influence Lines. R. W. Flowers, and H. N. Jones, Jr. Stress sheets, diagrams and tables. Two papers discussed together. 44 pp. W S E, JI—Feb., 1916.

Truss Deflections Accurately Determined by Angle Changes and Elastic Weights (70379). D. B. Steinman. Ills. 4000 w. E R—May 13, 1916. Serial, 1st part. Various methods explained and compared.

Études sur les fermes métalliques sur poteaux (65447 D). Paul Guillot. Ills. 39 pp. Soc Ing Civ Fr Mem—April-June, 1915. Mathematical formulas for design of trusses on columns.

Venturi Meters

Abnormal Coefficients of the Venturi Meter (69802 N). Arnold Hartley Gibson. Plate. 18 pp. I C E, No. 4117—1915. Investigates possible explanations.

Venturi Meters Inaccurate on Lively Lines (72511). Allen Hazen. 800 w. E N—Aug. 17, 1916. Non uniform flow in pipe may reduce venturi coefficient from 0.99 to 0.90.

Venturi Meter Succeeds in Irrigation (71089). Ills. 1100 w. E N—June 15, 1916. Application to new use.

Water Flow

The Alignment Diagram Applied to the Flow of Water in Uniform and Compound Mains (73061). D. Halton Thomson. 2500 w. Cn E—Sept. 7, 1916. Serial, 1st part. New method of graphic representation applied to flow in water mains.

Weir Formulas

New Method of Deriving Weir Formulas (73861). Theodore R. Running. Ills. 1600 w. E N—Oct. 12, 1916. Experiments at University of Michigan.

Weir Meter

Measuring Water with a Weir Meter (73342 D). E. G. Bailey. Ills. 1300 w. O S M E S E, JI—Vol. VIII, No. 2. Details of the Bailey weir meter and its practical use.

Weirs

The Flow of Water Over Sharp-Edged Notches and Weirs (69803 N). Harold John Frederick Gourley and Bernard Santo Crimp. Ills. & tables. 21 pp. I C E, No. 4129—1915. Investigations.

Test Made of Model Weir (69388). Ben D. Moses. Ills. 500 w. E R—April 8, 1916. Laboratory investigation.

Wind Pressure

L'action du vent sur les constructions (65453 B). G. Espitallier. Ills. 2000 w. Gen Civ—Oct. 16, 1915. Serial, 1st part. Mathematics of wind pressures especially on hangars.

Consult Classification of the Index. See page 7.

Wood Tests

Wood Tests

Recent Progress in Testing Wood Used by the Railroads (71032). Howard F.

MUNICIPAL

Activated Sludge

Weiss, with discussions. 8500 w. S L R C, Pro—May 12, 1916. Tests desirable and other improvements.

MUNICIPAL

Activated Sludge

Activated Sludge Process in Treatment of Tannery Wastes (73897 A). Harrison P. Eddy and Almon L. Fales. 3500 w. S M C E—Sept. 29, 1916. Results of tests in Norwood, Mass.

Activated Sludge Sewage Treatment (74014). 4500 w. Mun JI—Oct. 19, 1916. Serial, 1st part. Abstracts of papers before Am. Soc. of Munic. Imp. giving results at 11 plants.

Large Activated Sludge Plant at Milwaukee, Wis. (73859). Ills. 1400 w. E N—Oct. 12, 1916. Layout, details of design, and rates.

Activated Sludge Experiments at Milwaukee (70681). R. O. Wynne-Roberts. 3500 w. Cn E—May 25, 1916. Further facts brought out by experimental work.

Sewage Disposal by the Activated Sludge Process (70785). T. Chalkley Hatton. Extracts from paper before Ontario Health Officers Assn. 4500 w. Cn E—June 1, 1916. Deals with work at Milwaukee.

Air-Diffuser Experiences with Activated-Sludge Tanks (71945). 5400 w. E N—July 20, 1916. Experiences.

The Activated Sludge Method of Sewage Purification (71689 N). 17000 w. JI I & E C—July, 1916. Nine papers by different authors presented at April meeting of Am. Chem. Soc.

Tests Show Activated Sludge Process Adapted to Treatment of Stock-Yards Wastes (72127). 3000 w. E R—July 29, 1916. Results of experiments.

Sewage Treatment by Aeration and Activation (74059). George T. Hammond. Read before Am. Soc. of Munic. Imp. Ills. 4000 w. Cn E—Oct. 19, 1916. Development of process, with details.

Some Observations on the Treatment of Sewage by Activated Sludge (69585 A). W. H. Duckworth, with discussion. 4000 w. S M C E—March 31, 1916. Review.

Status of Activated-Sludge Sewage Treatment (69698). George T. Hammond. Ills. 2600 w. E N—April 27, 1916. Visits to American plants.

The Latest Method of Sewage Treatment (69764 B). Edward Bartow. 5000 w. B S C E, JI—April, 1916. Aëration in presence of sludge.

Experiences in the Application of the Activated Sludge Process to Chicago

Stockyards Sewage (69901). Arthur Lederer, before Am. Chem. Soc. 1100 w. E & C—April 26, 1916. Facts of chemical and biological nature.

Activated Sludge in Houston (69918). Ills. 3000 w. Mun JI—April 27, 1916. Methods and results.

Winter Experience with the Activated Sludge Process of Sewage Treatment at Milwaukee—Sludge Disposal (69899). William R. Copeland, before Am. Chem. Soc. 1200 w. E & C—April 9, 1916. Analytical data.

The Activated Sludge Experiments at Salford (67241 A). W. H. Duckworth. 3500 w. S M C E—Dec. 24, 1915. Results of recent experiments.

The Treatment of Sewage by Aeration in the Presence of Activated Sludge (66085). Edward Bartow. Read at San Francisco. Ills. 3000 w. M & C E—Dec. 1, 1915. Process; properties of sludge; applications.

The Activated Sludge Experiments at Salford (67338 A). 3000 w. Enr—Dec. 31, 1915. Review of W. H. Duckworth's paper read before Assn. of Mgrs. of Sewage Disposal Works, dealing with results obtained.

The Activated-Sludge Process of Sewage Purification (68266 A). G. J. Fowler. Read before Inst. of San. Engrs. 4500 w. S M C E—Feb. 4, 1916. Summarized results; probable future.

Activated Sludge (67928 A). C. H. Cooper. 1500 w. S M C E—Jan. 21, 1916. Report of experimental work.

Summary and Latest Results of Experimental Work on Activated Sludge at Milwaukee, Wis. (67802). T. Chalkley Hatton. Read at Urbana, Ill. 5500 w. E & C—Feb. 2, 1916.

The Activated Sludge Process of Sewage Purification (69570 A). G. J. Fowler. 4500 w. I S E, JI—March, 1916. Results thus far obtained.

Milwaukee Activated Sludge Investigations (69962). R. O. Wynne-Roberts. Ills. 3000 w. Cn E—April 27, 1916. Resume of results.

Sewage Treatment by the Activated Sludge Process (73416 B). Henry Traxler. 2800 w. Iowa Eng Soc—Feb., 1916. The process, and results obtained.

Atmospheric Pollution**Atmospheric Pollution**

The Character and Extent of Atmospheric Pollution in English and Scotch Towns, with Notes Upon a New Type of Recording Actinometer (66462). John B. C. Kershaw. Ills. 3000 w. M & C E—Dec. 15, 1915.

Atmospheric Pollution in English and Scottish Towns (66079 A). John B. C. Kershaw. Ills. 3000 w. Enr—Nov. 19, 1915. Results of observations.

Bathing Beach

Clarendon Municipal Bathing Beach, Chicago (74013). F. H. Bernhard. Ills. 1700 w. Mun JI—Oct. 19, 1916. Arrangements for use of this beach.

Baths

See Filtration under *Water Supply*.

Bituminous

Bituminous Macadam and Bituminous Concrete Pavements (73768). Arthur H. Blanchard. Ills. 4500 w. Mun JI—Oct. 5, 1916. Latest opinions on materials.

Brick

Building Monolithic Brick Road (73947 A). Stanley E. Bates. Ills. 1500 w. Cnr—Oct. 15, 1916. Construction methods.

In Monolithic Pavements in Vermilion County, Illinois, Brick Are Laid Directly on Concrete Base (73618). Harlan H. Edwards. Ills. 3000 w. E R—Sept. 30, 1916. Construction procedure.

Recent Developments in Brick Pavement Construction (73769). Maurice B. Greenough. Ills. 2500 w. Mun JI—Oct. 5, 1916. Proper methods.

Building Code

See Construction.

City Administration

The Administration of European Cities (67387). Julius Pitzman. Map. 6500 w. A E S JI—Dec., 1915. Outlines the administration of London, Brussels, Amsterdam, Bremen, Hamburg and Berlin.

City Managers

The City Manager—A New Opportunity for Engineers (73880 B). Gaylord C. Cummin, with discussion. 22 pp. W S E, JI—Sept., 1916. What has been accomplished in Jackson, Mich.

City Planning

Town Planning Schemes and Open Spaces (67927 A). Lawrence W. Chubb. From a paper read before Town Planning Inst. 4500 w. S M C E—Jan. 21, 1916. Recreation grounds; open spaces; possibilities in England.

Urbanisme et la reconstruction des villes detruites au cours de la guerre (67015 N). 55 pp. S I C F Pro-Ver—Nov. 26, 1915. Discussion of paper by G. Courtois.

MUNICIPAL**City Planning**

Urbanisme et la reconstruction des villes detruites au cours de la guerre (66229 N). G. Courtois. 27 pp. S I C F Pro-Ver—Oct. 29, 1915. Principles to be followed in rebuilding towns destroyed in the war.

Excess Condemnation and City Planning (71617). Charles K. Mohler. Ills. 1900 w. E N—July 6, 1916. Argument for taking more land than is needed.

Federal Plan Commission's Report (69820). Ills. 2500 w. Cn E—April 20, 1916. Abstract. Plans for Ottawa and Hull.

Town Planning: With Special Reference to the Doncaster District (69869 A). Percy Morris. From paper at N-E Dist. meeting of Inst. of Mun. & Co. Engrs. Also discussion. Ills. 5000 w. S M C E—April 7, 1916. Suggestions and difficulties.

Obligatory Town Planning. I. The Case. Henry R. Aldridge. II. Provisions Which Should Be Made Obligatory. Harold Shawcross (72683 N). With discussion. 24 pp. I M C E, JI—Aug., 1916. Considers the questions from different viewpoints.

Fundamental and Economic Considerations in Relation to Town Planning (73215 N). William Ross Young, with discussion. 3500 w. I M C E, JI—Sept., 1916. Problems in successful planning.

Our Cities, To-day and To-morrow (73340 A). John E. Lathrop. 1500 w. E C B, JI—Sept., 1916. Economic structure of cities.

Benefits Derived by an Urban District Adopting a Town Planning Scheme (66685 A). W. Louis Carr. Also discussion. 6500 w. S M C E—Dec. 10, 1915. Benefits to the public and to landowners.

Industrial Development (68830 N). Paul Whitham. Ills. 8 pp. P N S E, Pro—Dec., 1915. Importance of railway and water terminal factors in factory districts.

City Planning on an Exceptionally Large Scale Is Meeting with Public Approval at Philadelphia (68701). Ills. 2500 w. E R—March 11, 1916. Radical departures.

Town Planning: Its Development and Utility (70113 B). J. W. Cockrill. Ills. 20 pp. I M C E JI—Apr. (2nd), 1916. General, with discussion.

The Principles and Position of Town Planning (70076 A). W. R. Davidge. From paper before Surv's Inst. 3000 w. S M C E—April 21, 1916. Tendencies, aims, etc.

Town Planning: With Special Reference to the Doncaster District (70115 B). Percy Morris. Ills. 14 pp. I M C E JI—

Cooperation

Apr. (2nd), 1916. Work and plans; with discussion.

City Planning at Cebu (70331). R. C. Hardman. Ills. 1700 w. E N—May 11, 1916. Rearrangement of street system.

Cooperation

The Engineer and the Architect (72842 N). Arnold W. Brunner. 3000 w. A R E A, Bul—July, 1916. Cooperation in city planning.

Cubic Performance

See same heading under *Measurement*.

Culverts

Culverts—Their Location and Construction (73931). Charles D. Norton. Ills. 3000 w. Cn E—Oct. 12, 1916. Suggestions on design, construction, and proper location of various types.

The Design of Flat Arch Corrugated Iron Culverts for Use Under Paved Streets (73696). J. Alden Griffin. Ills. 1600 w. E & C—Oct. 4, 1916. Requirements of the specification for Los Angeles.

Concrete

Easton-Bethlehem Concrete Highway (73770). John McNeal. Ills. 1500 w. Mun JI—Oct. 5, 1916. Model road twelve miles long.

Should Wider Joints Be Provided in Concrete Roads Laid Late in the Season? (73922). H. S. Van Scoyoc. Ills. 1500 w. E R—Oct. 14, 1916. Heaving of joints on Canadian highway project.

Concrete Structures

Unit Concrete Construction for Manholes, Vaults and Catch Basins at St. John, N. B. (69536). R. Fraser Armstrong. Ills. 500 w. Cn E—April 13, 1916. Construction.

Drainage

House Drainage (71002 A). G. Belson Chilvers. Read before Inst. of Munic. Engrs. 4500 w. S M C E—May 26, 1916. Details of inside and outside work.

Economy

Municipal Economy in War-Time (66920 A). Edward Willis. 2000 w. Surveyor—Nov. 12, 1915. Serial, 1st part. Suggestions.

Filing

Filing Correspondence in a Municipal Department (69694). Robert J. Fee. 2400 w E N—April 27, 1916. Methods of N. Y. City Board of Water Supply.

Fire Alarms

San Francisco's New Fire Alarm Station (66119). James M. Barry. Ills. 3000 w. Mun JI—Dec. 2, 1915. Capacity for 130 circuits. Method of operation.

Fire Apparatus

Camden's All-Motor Fire Department (72702). Ills. 1000 w. Mun JI—Aug.

MUNICIPAL**Imhoff Tanks**

24, 1916. 25 pieces of motor driven apparatus; 11 of them electric.

Fire Protection

Fire Prevention (67393 A). Charles E. Meek. 3500 w. E S P JI—Dec., 1915. The National Fire Protection Association and what it has accomplished; fire insurance, etc.

Improvements in Philadelphia's Fire Alarm System (67453). Ills. 1200 w. Mun JI—Jan. 20, 1916. Details of reconstruction.

Notes on Fire Protection (69069 N). T. N. Hooper. 900 w. A W A, JI—March, 1916. Relation of water-works system to fire protection.

City Fire Limits (66525 N). Albert Blauvelt. Ills. 2500. A W A—Dec., 1915. The need of higher requirements.

Determination of the Value of Fire Protection Afforded by the Queens County Water Company (70579 N). Joseph Goodman, with discussion. Map. 6000 w. A W W A, JI—June, 1916. Outlines methods pursued.

The Chicago Fire Department (72703). Geddes W. Rutherford. 2500 w. Mun JI—Aug. 24, 1916. Organization and methods.

See same heading under **INDUSTRIAL MANAGEMENT, Welfare and Safety**.

Garbage Disposal

Five Thousand Hogs Eat Denver's Garbage (72126). Ills. 1500 w. E R—July 29, 1916. Successful piggery.

Garbage and Rubbish Disposal in Los Angeles, Calif. (73856). Seward C. Simons. Ills. 2300 w. E N—Oct. 12, 1916. City nets \$32,000 a year.

Garbage Disposal for Two Illinois Cities (73858). Samuel A. Greeley. 1600 w. E N—Oct. 12, 1916. Report on schemes for Danville and Galesburg.

Havana

El sistema de alcantarillado y pavimentacion de la Ciudad de la Habana (68825 N). Ills. Maps and Plates. 73 pp. S C I Rv—Feb., 1916. Serial, 1st part. Extensive exposition of paving and sewerage method in Havana.

Harbor Pollution

The Pollution of New York Harbor and Its Remedy (74140 B). Kenneth Allen. Map and Ills. 4000 w. Mun Engrs' JI Oct., 1916. A study of conditions.

Imhoff Tanks

Imhoff Tanks (71927 B). Albert Roth. Ills. 2500 w. M E—1916. Basis of design and unit costs.

Separate Sludge Digestion. Improves Imhoff-Tank Operation by Keeping Sewage Fresh (71977). Dr. Karl Imhoff. Ills. 2000 w. E R—July 22, 1916. Auxiliary sludge chamber provided.

Consult Classification of the Index. See page 7.

Indianapolis**Indianapolis**

How a Contractor is Putting a Stream Underground (67037). Ills. 1600 w. Cnr—Jan. 15, 1916. The covering over of Pogues Run.

Lille

Abwasserbeseitigung und Kehrrechtbehandlung in Lille (66246 B). Paul Keim. 1500 w. G-I—Dec. 4, 1915. Methods of handling sewage and refuse in Lille.

Mapping

Washington Systematizes Sub-surface Mapping (72720). Asa E. Phillips. Ills. 2000 w. E R—Aug. 26, 1916. Permanent records of underground structures.

The Mapping of Canadian Cities (67103). Douglas H. Nelles. Ills. 3500 w. Cn E—Jan. 6, 1916. Serial, 1st Part. Value of large-scale maps.

Model Towns

Morgan Park—A Beautiful Steel-Mill Town (67109 B). Ills. 1800 w. I A—Jan. 6, 1916. Built by Minnesota Steel Co. to house employees of its recently constructed plant.

Mosquitoes

Mosquito Extermination in Panama and New Jersey (71114 B). Harold I. Eaton. Ills. 2500 w. B S C E, JI—June, 1916. Reviews history of the work.

Municipalities

The Success of an Unique Experiment by New York State Cities (72309). William P. Capes. 2000 w. Cn E—Aug. 3, 1916. Describes a cooperative plan.

Municipal Plant

Quitman Municipal Water and Light Plant (70813). F. B. Crowell. Ills. 1200 w. Pwr—June 6, 1916. Test figures of new plant in Georgia.

Chicago Has New Shop Plant for All Public Works (70762). C. C. Saner. Ills. 1900 w. E N—June 1, 1916. Economy in centralizing all shop and repair work.

Municipal Work

Recent Municipal Work in Cambridge (71158 N). Julian Julian. Ills. 4500 w. I M C E, JI—June 1, 1916. Works of construction in England.

Recent Municipal Works and Practice in Hull (70849 A). F. W. Bricknell. 5000 w. S M C E—May 19, 1916. Recent improvements.

Nitrogen

Nitrogen from Sewer Sludge Plain and Activated (73723). William R. Cope-land, with discussion by George W. Fuller and others. 3000 w. E N—Oct. 5, 1916. Review of possibilities with consideration of Milwaukee studies.

MUNICIPAL**St. Louis****Philadelphia Works**

The Gas Works of Philadelphia (73315 A). P. T. Dashiell. Also editorial. Ills. 5500 w. E C P, Pro—Sept., 1916. First of a series of articles on the industrial plants of Philadelphia.

Power Plant

See Municipal Plant under ELECTRICAL ENGINEERING, *Generating Stations*.

Public Utilities

Growth of a Combination Utility in a Small City (70217). Arthur Curtis Scott. Ills. 1500 w. El W—May 6, 1916. Texas property furnishing electricity, water and ice.

Refuse

Disposal of Municipal Refuse (71511 A). Hiram Phillips. 3000 w. E C St L, JI—May-June, 1916. Methods.

Results Obtained by Electric Vehicles in the Removal of House Refuse (72290 A). J. Terry. 3000 w. S M C E—July 21, 1916. Cost, batteries, working costs, etc.

Refuse Destruction

Garbage Collection and Incineration in Sewickley, Pa. (65702). Edward E. Duff, Jr. Ills. 1500 w. Munic Jour—Nov. 11, 1915. Can collection.

Refuse Disposal

Planning for Garbage Collection (66538). 3000 w. Mun-JI—Dec. 16, 1915. How to determine number and capacity of vehicles, time required for collecting and relative costs.

The Collection and Disposal of Garbage in Dayton, O. (66500). J. E. Barlow. Abstract of paper before Am. Soc. of Munic. Imp. 2000 w. E & C—Dec. 15, 1915. New reduction plant having novel features.

5-Ton Garbage Reduction Plant Yields Profit to City (69828). George R. Bascom. 1200 w. E R—April 22, 1916. Test at Pontiac, Mich.

Refuse Removal and Disposal in Moose Jaw (69104). George D. Mackie. 1200 w. Cn E—March 23, 1916.

Experts Testify on Means of Eliminating Odors in Garbage Reduction (66920). 2500 w. E R—Jan. 1, 1916. Suit at Springfield, Mass., brings out opinions in regard to best methods of treating foul gases.

Refuse Incinerator

Refuse Incinerator for Queens Borough, New York City (73585). J. C. Woodman. Ills. 1500 w. E N—Sept. 28, 1916. Description and test results of a 100-ton Decarie plant.

St. Louis

River Terminals and a Boulevard System for St. Louis (66456 A). Julius Fitz-

Sanitation

man. 3500 w. A E S—Nov., 1915. Defects in city development and remedies.

The Railroad Problem in City Planning for St. Louis (72354). Walter B. Stevens. 3300 w. S L R C, Pro—July 14, 1916. Discusses changing conditions and requirements.

Sanitation

Sanitary Engineering in 1915 (67669 A). 5000 w. Enr—Jan. 14, 1916. Review of year's progress.

A District Sanitary Disposal Plant (65517). Flora Spiegelburg. Ills. 1500 w. Sci Am Sup—Nov. 6, 1915. System for city waste.

The Destructive Distillation of Faeces (67006 A). J. Menzies. Ills. 10 pp. I S E JI—Dec., 1915. Experiments and possibilities.

Kimberley City Sanitary System (67242 A). James Dunn. 3000 w. S M C E—Dec. 24, 1915. Changes effected during past two years.

Concrete Septic Tanks for Farm and Town Dwellings (72332 A). Ills. 2000 w. Mun E—Aug., 1916. Designs.

The Cleaning Up and Improvement of a Stream Polluted by Sewage and Trade Wastes (72415). Harrison P. Eddy. 5000 w. E & C—Aug. 9, 1916. Work on the Neponset River.

The Element of Chance in Sanitation (71768 B). George C. Whipple. 22 pp. F I, JI—July, 1916. Serial, 1st part. Ways in which the laws of chance may be applied.

Infiltration of Ground Water into Sewers (73414 B). C. P. Chase. 2500 w. Iowa Eng Soc—Feb., 1916.

Sewage Disposal

The Disposal of Sewage by Dilution: a Bio-Chemical Method of Purification (67765 A). W. E. Adeney. 23 pp. I S E, JI—Jan., 1916. With discussion.

Sewage Tank Gas Utilized for Light and Heat (67864). Charles C. Hommon. Ills. 1200 w. E R—Feb. 5, 1916. Metal collectors over vents of Imhoff tanks. At Atlanta.

Mechanische Kläranlage mit daneben gelagerten Schlammfäulräumen (67727 B). Geissler. Ills. 3500 w. G-I—Jan. 1, 1916. Equipment and operation of Nordhausen sewage-treatment plant.

Design and Construction of the Sewage Treatment Plant at Pana, Ill. Trickling Filter a Feature (67977). A. C. Stanfield. Read before Ill. Soc. of Engrs. & Survs. Ills. 1500 w. E & C—Feb. 9, 1916. How project was financed.

Largest Imhoff Tank Plant Nearly Ready to Treat Rochester's Sewage (68055). C. Arthur Poole. Ills. 4500 w.

E R—Feb. 12, 1916. Construction methods; design data.

Brooklyn Adds an Automatic Sewage-Pumping Station (74149). L. J. Gersoni. Ills. 1700 w. E N—Oct. 26, 1916. Equipment and operation.

Building Albany Sewage Pump House and Grit Chamber (74022). Stephen B. Vernon. Ills. 1500 w. E N—Oct. 19, 1916. An interesting caisson sinking job.

Chicago's Bubbly Creek Will Bubble No More (74019). Ills. 1300 w. E N—Oct. 19, 1916. Conduit being constructed to carry sewage and trade wastes.

Marysville, Ohio, Sewage-Treatment Plant Provides for High Degree of Purification (65875). E. D. Barstow. 1200 w. Eng Rec—Nov. 20, 1915. Plan adopted.

Disposal of Greater New York's Sewage (65535). Charles E. Gregory. 2500 w. Munic Jour—Nov. 4, 1915. Abstract of paper before Munic. Engrs. of N. Y. General plan; digesting power of harbor.

New Sewage Disposal Works at Wanstead (65635 A). Ills. 4500 w. Engng—Oct. 22, 1915. Recent alterations and extensions.

Choosing Air Compressors for Activated-Sludge Tanks (65544). Carl H. Nordell. 2500 w. Eng News—Nov. 4, 1915. Types considered.

The Disposal of Sewage by Dilution: a Bio-Chemical Method of Purification (66684 A). W. E. Adeney. Read before Inst. of San. Engrs. 7000 w. S M C E—Dec. 10, 1915. Practice, factors to be considered.

The Construction and Working of the Royal Military Camp Sewage Disposal Works at Ripon (66072 A). Arthur W. Smith. 1500 w. S M C E—Nov. 19, 1915. Engineering details.

Sewer Cleaning in Atlantic City (66537). Frederick T. Parker. Ills. 1500 w. Mun JI—Dec. 16, 1915. Methods used.

Disposal of Suspended Matter in Sewage (67332 A). Rudolph Hering. Read before Int. Engng. Cong. 5500 w. S M C E—Dec. 31, 1915. Collection, delivery and sanitary disposal.

Eight Years of Imhoff Tank Design and Operation (66996). Ills. 4500 w. E N—Jan. 6, 1916. Serial, 1st Part. Experience with two-story tanks in Germany and America.

Cleburne's Sewage Disposal Plant (72267). R. C. Lowry. Ills. 1000 w. Mun JI—Aug. 3, 1916. Imhoff tanks, sprinkling filters, and secondary settling tanks.

Consult Classification of the Index. See page 7.

Sewage Disposal

Hydrolytic Sewage Tanks at Luton, England (72268). J. W. Tomlinson. Ills. 3300 w. E N—Aug. 3, 1916. Design, construction and operation.

Lethbridge Sewage Disposal Works (72357 N). A. C. D. Blanchard. Ills. 15 pp. C S C E—March 4, 1915. Design and construction, with criticisms of the work as a whole.

Operation of Imhoff Tanks and Other Sewage-Disposal Plants (72496). F. V. Hammerly. 3000 w. W E—Aug., 1916. Precautions needed to obtain proper results.

Sewage Purification Plant at Pont-y-Wal, Breconshire (72294 A). 500 w. Eng—July 21, 1916. Plant for sanatorium.

Small Sewage Sprinkling Filter with Unique Features (72413). R. C. Hardman. Ills. 800 w. E & C—Aug. 9, 1916. Near Colorado Springs, Colo. Detailed description.

Double Tank Proposed for Residential Sewage Plants (72956). Waldo S. Coulter. Ills. 1500 w. E R—Sept. 2, 1916. Better operating results claimed for septic and Imhoff units in series.

Successful Sewage Disposal by Broad Irrigation (73581 A). Terrell Bartlett. Ills. 1200 w. E N—Sept. 28, 1916. Some 1600 acres are irrigated.

The Care and Operation of Sewage Disposal Plants in Iowa (73415 B). A. Marston. 1300 w. Iowa Eng Soc—Feb., 1916. Characteristics, and measures needed.

The Sewage Disposal Problem Confronting the City of Philadelphia (73356 B). W. L. Stevenson. 5000 w. B S C E, J1—Sept., 1916. Present conditions and plan adopted. Proposed works.

Small Sewage Treatment Plant (68858 N). Leslie C. Frank. 11 pp. N J S A, Pro—1915. Some results from U. S. Pub. Health Service work, with extensive discussion.

Use and Province of Imhoff Tanks in the Solution of Sewage Disposal Problems (68724 A). F. V. Hammerly. Ills. 3800 w. W E—March, 1916. Design and operation.

Cleveland's Sewage Treated by Revolving Screens and Novel Grit Chambers (69115). George B. Gascoigne. Ills. 3000 w. E R—March 25, 1916. Details of plant.

Method and Cost of Remodeling the Lake Forest, Ill., Septic Tank into a Modern Two-Story Settling Tank (69072). N. N. Campbell. Ills. 2500 w. E & C—March 22, 1916.

MUNICIPAL

Sewage Disposal

Oxygen Demand of Sewages (70128 N). F. W. Bruckmiller. 1800 w. J1 I E C—May, 1916. Results of investigation.

The Sewering of Principal Cities (70339 N). A. Peake. 3500 w. Cw E—April, 1916. Treatment at Bendigo, Victoria.

Sewage Screening and Sludge Burning Plant Prevent Sea Shore Nuisances (70482). Ills. 2200 w. E R—May 20, 1916. Plant at Long Beach, Cal.

Texas Sewage-Works Activity (70622). 1400 w. E N—May 25, 1916. New law.

Tests of a New Process of Sewage Purification with Grease Recovery and Apparent Profit (69889 A). Robert Spurr Weston. 3500 w. A J1 P H—April, 1916. Experimental study of Miles acid process.

Report of the Board of Engineers, Sewage Disposal to the Cities of Pasadena, South Pasadena and Alhambra, Los Angeles County, California (69652 N). Ills. Maps. 53 pp—March 27, 1916.

Sewage Treatment Study for Niagara Falls, Ontario (71118). H. S. Philips. Ills. 2000 w. Cn E—June 15, 1916. Notes from report.

The Extent to Which Sewage Can Be Purified by Practicable Methods of Artificial Treatment Now in Use (71196 B). Harrison P. Eddy. Ills. Discussion. 13500 w. E S W P, Pro—April, 1916. Available methods and their relation to each other.

Traveling Sewage-Distributor Changes, Springfield, Mo. (70764). Alexander Potter. Ills. 1600 w. E N—June 1, 1916. Cable drive changed to direct motor drive, with good results.

Conservation of Operating Head Controls Design of Oaklyn (N. J.) Sewage Plant (71137). W. DeWitt Vosbury. Ills. 1800 w. E R—June 17, 1916. Gravity installation.

The Sewage Problem (72150 A). Dr. Sidney Barwise. 2500 w. S M C E—July 14, 1916. Presidential address on latest developments and future possibilities.

Kansas Experience in Running Small Sewage Works (71784). F. M. Veatch. 2500 w. E N—July 13, 1916. Need and economy of efficient supervision.

Sewage-Testing Station Report Limits Processes (71823). 1800 w. E R—July 15, 1916. Items from Cleveland report.

I. The Detroit Sewage Disposal Problem. Clarence W. Hubbell. II. The Grand Rapids Sewage Disposal Problem. Lewis D. Cutcheon (71926 B). 3500 w. M E—1916. Results of investigations.

Grit Chamber and Pump Station, Albany Sewage-Works (71264). John H. Gregory. Ills. 2400 w. E N—June 22,

Sewage Treatment

1916. Serial. 1st part. Detailed description.

Sewage Treatment

Results of First Year's Experiments With Small Sewage Treatment Plants by U. S. Public Health Service (71550). Leslie C. Frank. From a paper before the N. J. Sanitary Assn. 3500 w. Cn E—June 29, 1916. Discusses combination of Imhoff tank and sand bed.

Sewerage

Keele Street Sewer System, Toronto (65878). Ills. 1500 w. Can Engr—Nov. 18, 1915. Serial, 1st part. Storm overflow sewer for western section.

Sewerage in the Doncaster Rural District (69868 A). Walter R. Crabtree. Also discussion. Ills. 4000 w. S M C E—April 7, 1916. Schemes carried out in this English district.

The Cause, Amount and Restriction of Infiltration of Ground Water into Sewers (69473). Charles P. Chase. Read before Iowa Eng. Soc. 2500 w. E & C—April 12, 1916. Leakage, difficulties; how to secure tight work.

Sewerage System at the General Electric Company's Works, Schenectady, N. Y. (67640 A). Paul G. Koch. Ills. 1000 w. G E R—Feb., 1916. General description.

The South End Sewer System of Boston (66516 B). Edgar S. Dorr. Map & Ills. 5500 w. B S C E—Dec., 1915. Explains conditions and describes the pumping station and other relief work.

A Modification of Whipple's Method for Organic Nitrogen in Sewages (70823 N). F. W. Bruckmiller and L. E. Jackson. 1200 w. J I & E C—June, 1916. Modified method for determining organic nitrogen.

Sewerage in the Doncaster Rural District (70114 B). Walter R. Crabtree. Ills. 13 pp. I M C E J—Apr. (2nd), 1916. Description, with discussion.

Quantity of Gasoline Necessary to Produce Explosive Conditions in Sewers (71861). G. A. Burrell and H. T. Boyd. Ills. 12 pp. U S B M—Tech paper 117. Results of tests.

Sewer Pipe

Iron and Steel Sewer Pipe (73043 A). J. F. Springer. Ills. 3000 w. Mun E—Sept., 1916. Methods of laying, testing and protecting pipe.

Sewers

I metodi grafici tedeschi per il calcolo della massima portata attribuibile ad una data sezione del collettore di una zona di fognatura in relazione alle piogge più critiche (67064 B). Felice Poggi. Ills. 2600 w. M T—Dec. 30, 1915. Serial, 1st

MUNICIPAL**Sewers**

Part. Discussion of graphic method for determining capacity of sewers to handle run-off from heavy rains.

A Notable Application of Electrically Driven Machinery in Sewer Construction at Salt Lake City, Utah (67138). Bayard W. Mendenhall. Ills. 1500 w. E & C—Jan. 5, 1916. Use of portable substation.

Hydraulic Ejectors for Grit Removal Merit Trial in Sewer Maintenance (67080). John H. Gregory. Ills. 2500 w. E R—Jan. 29, 1916. Tests needed to demonstrate possibilities of method adopted in Seattle.

Rideau River Intercepting Sewer (67278). L. McLaren Hunter. Map. 700 w. Cn E—Jan. 13, 1916. Work at Ottawa.

Main Garrison Creek Storm Overflow Sewer and Extensions, Toronto (67604). R. T. G. Jack. Ills. 4000 w. Cn E—Jan. 27, 1916. Construction; particular reference to Sec. No. 4.

Privately Financed Sewer Systems for Small Town Produces \$2,000 Yearly Revenue (67173). Henry W. Taylor. 2200 w. E R—Jan. 8, 1916. Project at Troy, Penna.

Submerged Sewer Outlet in Harlem River, New York (73944). Ills. 1000 w. Cnt—Oct., 1916. Brick sewer and concrete chamber constructed in simple cofferdam.

Constructing a Large Concrete Sewer at Chicago (66741). Ills. 1400 w. E N—Dec. 23, 1915. Plant and methods.

Some Features of the Design of Combined and Storm Water Sewers (68642). E. S. Spencer. 1200 w. E & C—March 8, 1916. Paper before Mun. Engrs' and Survs' Soc.

Use of Compressed Air in Toronto Sewer Construction (68556). W. G. Cameron. Ills. 3500 w. Cn E—March 2, 1916. Methods and cost.

Edmonton's Tunnel Sewer System (72358 N). A. J. Latonnell. Ills. 23 pp. C S C E—April 8, 1915. Deals with sewers serving territory on the north side of Saskatchewan River.

Methods of Concrete Sewer Construction (72230 A). J. F. Springer. Ills. 3000 w. Mun E—Aug., 1916. Descriptions of actual work.

Sewer Construction in Brooklyn (72392). Ills. 1000 w. Cnt—Aug. 1916. Serial, 1st part. Deep open trench work.

Some Ideas in Sewer Work (72434). W. G. Cameron. Ills. 1000 w. Cn E—Aug. 10, 1916. Increase in efficiency at Toronto.

Sewers

MUNICIPAL

Statistics

Why House Connections to the Sewer Should Be Carefully Made (68296 A). C. G. Wigley. 1600 w. C C E—Feb., 1916. Objections to some methods; financial aspects.

Methods, Cost and Results Obtained in the Use of Asphalt for Joints in Tile Pipe Sewers (68290). Paul E. Green. Ills. 4000 w. E & C—Feb. 23, 1916.

Building Relief and Outlet Sewers at Chicago (67816). Ills. 1800 w. E N—Feb. 3, 1916. Details of construction forced by new Union Station.

History and Design of the Mill Creek Sewer (68092 A). W. W. Horner. Ills. 7000 w. E C S L, JI—Jan.-Feb., 1916. Design, routes, shafts, construction, and other features.

Storm Sewers in Moose Jaw, Sask., (68205). George D. Mackie. Ills. 1000 w. Cn E—Feb. 17, 1916. Construction, method and cost.

How a Contractor is Laying Small Sewers in Boston (66334 A). Daniel J. Haner. 2000 w. E C—Oct., 1915. Comparison of hand and machine methods.

Reinforced Concrete in Sewer Construction (70248 A). W. W. Horner. Read before Am. Concrete Inst. 3500 w. W E—May, 1916. Design and construction.

Hints on the Construction of Vitrified Clay Segment Block Sewers (69362). J. M. Egan, Jr. From paper before Ill. Soc. of Engrs. & Survs. 1200 w. Cn E—April 6, 1916. Blocks and methods.

Sewer Tunnel Lined with Vitrified Blocks (69508). A. C. Remley. Ills. 2000 w. Mun. JI—April 13, 1916. At Appleton, Wis.

Building a Concrete Sewer in Boston During the Winter (69296). Daniel J. Hauer. Ills. 1200 w. Cnr—April 1, 1916. Economic work.

Building 22 Miles of Pipe Sewers Under one Contract (69209). Ills. 2200 w. E N—March 30, 1916. Trenching machines in Topeka, Kan.

Efficient Methods Employed on Construction of Big Sewer (71144 A). Ills. 1800 w. Cnr—June 15, 1916. Calumet intercepting sewer, Chicago.

A 60-in. Monolithic Concrete Storm Sewer at Houston, Texas (71105). G. L. Fugate. Ills. 1200 w. Crt—June, 1916. Construction and cost.

Long-Time New York Rainfall as Basis for Sewer Design (72930). O. Hufeland. Ills. 3800 w. E N—Aug. 31, 1916. Serial, 1st part. An analysis of 45-yr. rainfall records.

Building the Norwood Park Brick Sewer in Chicago (70800 A). Ills. 1500 w. Cnr—June 1, 1916. Equipment, methods, and materials.

Construction of Garrison Creek Sewer, Toronto (70980). Ills. 2500 w. Cnt—June, 1916. Methods of excavating and concreting.

Segmental Sewer in Oakdale (70353). G. D. Crain, Jr. Ills. 2000 w. Mun JI—May 11, 1916. Building 57-in. sewer on curve.

Steel Aqueduct for Sewer (70330). Ills. 300 w. E N—May 11, 1916. Curious method in San Antonio, Tex.

Sheringham

Nine Years' Work at Sheringham (Eng.) (74243 N). F. Hall Smith, with discussion. Ills. 14 pp. I M C E, JI—Oct., 1916. Municipal works at a watering place in England.

See also Tunnels under *Construction*.

Smoke

Smoke as a Source of Atmospheric Pollution (68754 B). W. F. M. Goss. Maps. 34 pp. F I, JI—March, 1916. Investigations in Chicago.

Cleveland's Smoke Problem and the Answer (72603 B). Osborn Monnett, with discussion. Ills. 15 pp. C E S, JI—July, 1916. A study from the engineering standpoint.

Smoke Prevention (67040 A). A. L. Nesbit. 14 pp. E C D—Nov., 1915. Work in Pittsburgh, investigation.

Snow Removal

Snow Removal in Montreal (72080). P. E. Mercier. Read before Can. Int. Good Roads Cong. 1800 w. Cn E—July 27, 1916. Administration, organization, machinery used, etc.

Cleaning Up After Snowstorms in Philadelphia (67817). William H. Connell. Ills. 1800 w. E N—Feb. 3, 1916. Methods employed with unusual degree of success.

Systematic Snow Removal in New York City (67872 A). Ills. 4000 w. Mun E—Feb., 1916. Details.

Schwedischer, elektrisch betriebener Schneeförder- und -verlade-Eisenbahnwagen zur Schneeabseitung auf sweigleisigen Eisenbahnstrecken (67726 B). Ills. 600 w. E K u B—Jan. 4, 1916. Swedish electrically driven snow loader and remover for double-track railroad.

Prompt Snow Removal in Philadelphia, Pa. (70914 A). William H. Connell. Ills. 2000 w. Mun E—June, 1916. Outlines methods.

Statistics

Diagrammatic Statistics for Municipal Engineers (74060). Reginald Brown. 1200 w. Cn E—Oct. 19, 1916. Urges use of diagrams or charts to show results. Read before Inst. of Munic. & Co. Engrs.

Storm Water**Storm Water**

Tanks for Temporary Storage of Storm Water (67104). W. G. Cameron. Ills. 1500 w. Cn E—Jan. 6, 1916. Design and methods of construction at Toronto.

Street Cleaning

Street Cleaning in Milwaukee (68782). Ills. 2000 w. B R & S—March, 1916. Economies effected.

Intensive Street Cleaning Methods (71509 B). Richard T. Fox, with discussion. Ills. 12500 w. W S E, JI—March, 1916. Standards developed in Chicago.

Some Results of the Use of Steam Tractors in Cleansing Work at Cardiff (72289 A). W. Harpur. 1500 w. S M C E—July 21, 1916. Essentials to secure economical working.

New York Street Cleaning (66120). Ills. 2000 w. Mun JI—Dec. 2, 1915. Itemized costs.

Street Cleaning and Pavement Economy (67135). Gus H. Hanna. Slightly condensed paper before Worcester Road Cong. 2500 w. Mun JI—Jan. 6, 1916. Elements of economy.

Machinery in Street Cleaning (67589). 2200 w. Mun JI—Jan. 27, 1916. Experiments at Milwaukee to determine cost and efficiency.

Street Lighting

Street Lighting by Indeterminate Contracts (70201). 3500 w. El R & W E—May 6, 1916. Outline of plan on cost of service basis.

Street Opening

The Development of the Street Opening Problem; Its Effect and Control (68922). N. S. Sprague. 3500 w. G R—March 4, 1916. Methods for relief and regulation.

Streets

Planning Street Alignment (67259). Ills. 1500 w. Mun JI—Jan. 13, 1916. Importance and economy.

Diagonal Thorofares (67454). Ills. 1400 w. Mun JI—Jan. 20, 1916. Serial, 1st Part. Advantages. District of Columbia rules.

Elevation of Low-Level Streets on Pittsburgh River Front (67584). Charles M. Reppert. Ills. 2000 w. E N—Jan. 27, 1916. Raising streets above flood level. New drainage system.

Street Watering

Street Watering with Electric Vehicles (72288 A). James Bee. Ills. 2000 w. S M C E—July 21, 1916. Vehicle used in Blackpool and its work.

The Results Obtained in Street Cleansing by Motors (72286 A). W. Greig. 3300 w. S M C E—July 21, 1916. Experience in Glasgow.

MUNICIPAL**Street Widths**

Practical Street Construction—Street Widths (68660). H. C. Hutchins. Ills. 2000 w. Mun JI—March 9 1916. Serial, 1st part. Space required; isles of safety, etc.

Swimming Pools

The Chemical Purification of Swimming Pools (73567 N). George W. Heise and R. H. Aguilar. 4500 w. P JI S—May, 1916. Chemical work on the swimming pools of Manila.

Some Features of Swimming Pool Control (73816 B). W. Lee Lewis. 9500 w. JI I & E C—Oct., 1916. Possibilities of such tanks becoming unhygienic.

Town Planning

Planning the Industrial Town of Iroquois Falls, Ontario (70863). A. P. Melton. Plan. 1500 w. E & C—June 7, 1916. Details of site and gridiron street system.

State Aid for Housing and Town Planning Schemes (70747 A). W. E. Whyte and W. Ross Young. 2000 w. S M C E—May 12, 1916. A plea for government help.

Traffic

London Traffic (67935 A). 2500 w. Eng—Jan. 21, 1916. Editorial on problems of urban transport.

How City People Travel (66975 A). Roger W. Toll. Maps. 4500 w. G E R—Jan., 1916. Analysis of traffic conditions in Denver, Colo.

Traffic Control

Systems of Traffic Control (70629). H. C. Hutchins. Ills. 2500 w. Mun JI—May 25, 1916. Conflicting interests of vehicles, foot passengers, and property owners.

Utility Lines

Comparative Merits of Four Types of Location of Underground Utility Lines (65506). Louis A. Dumond. From an article in *The American City*. 3000 w. Engng & Con—Nov. 3, 1915. Methods. European practice.

Chicago Builds Its First Utility Gallery (65719). Ills. 900 w. Eng Rec—Nov. 13, 1915. Details of construction.

Wastes

Experimental Studies of Strawboard Waste Purification (70600). Harry B. Homman. 4500 w. E & C—May 25, 1916. Methods of disposal.

A Summary of the Experience Gained in the Treatment of the Wastes from the Scouring of Wool (65647). Harry R. Crohurst and Arthur D. Weston. 7000 w. Engng & Con—Nov. 10, 1915. Explains processes and wastes produced, and methods of disposal with results.

Asphalt

Test Plant Operated to Deodorize Oil Refinery Wastes (65335). F. R. Hesser. Ills. 1500 w. Eng Rec—Oct. 30, 1915. Aeration, coagulation, sedimentation, and storage tried at Neodesia, Kan.

Analytical Study of Garbage, Rubbish and Ashes (72512). 2000 w. E N—Aug. 17, 1916. Abstract or report by I. S. Osborn on waste removal at Washington, D. C.

Purification of the Wastes from the Finishing of Woolen Goods (71217). H. R. Crohurst and A. D. Weston. 2000 w. E & C—June 21, 1916. Processes, and treatment of wastes.

ROADS AND PAVEMENTS**Bituminous**

Waste (71289). R. O. Wynne-Roberts. 3000 w. Cn E—June 22, 1916. Considered from the engineer's viewpoint.

Water Department

Water Department Organization and Management Under Municipal Control (73098). H. A. Whitney. 3000 w. W E—Sept., 1916. Gives an ideal plan for a city of about 100,000, with suggestions.

Wath-upon-Dearne

Municipal Works and Statistics of Wath-upon-Dearne (74085 N). J. H. Drew. Ills. 40 pp. I M C E, JI—Oct., 1916. Details of works.

ROADS AND PAVEMENTS**Africa**

Road Development in British East Africa (73146 N). Archibald George Bush. 2000 w. I C E, Paper No. 4140—1915. Construction details.

Asphalt

Asphalt Macadam Construction in Lake County, Indiana (71656). Ills. 500 w. E & C—July 5, 1916. Details.

The Fluxing of Asphalts (72079). Francis Pitt Smith. 2500 w. Cn E—July 27, 1916. Methods and their merits.

Latest Advance in the Technology of Asphalt Paving (73888 A). Daniel T. Pierce. Ills. 1800 w. E C P, Pro—Oct., 1916. The investigations of Clifford Richardson are reviewed.

The Merits of Refined Asphalt Roads (73795). Leroy M. Law. 3000 w. B R & S—Oct., 1916. Development of petroleum asphalts, processes and methods.

The Practical Testing of Asphalt and Road Oil (65646). T. A. Fitch. Read before Pan-Am. Road Cong. 2500 w. Engng & Con—Nov. 10, 1915. Brief explanation of methods.

Asphalt Repairing in Manhattan (65533). Ills. 1800 w. Munic Jour—Nov. 4, 1915. Method of using tractors economically.

The Modified Asphalt Roads of Lake County, Florida (70323). George L. Watson. Ills. 1600 w. M Rd—May 11, 1916. Methods of construction.

Municipal Asphalt Repairs in Scranton (67845 B). John G. Hayes. Ills. 2200 w. Mun JI—Feb. 3, 1916. (Special.) Motor driven asphalt plant.

Bituminous Materials Tests for Sheet Asphalt (72271). Francis P. Smith. 4800 w. E N—Aug. 3, 1916. Points raised in an alleged attack on specifications adopted in 1915.

Mechanical Handling of Asphalt (72306). S. G. Talman. Ills. 800 w. Cn E—Aug. 3, 1916. Layout for handling asphalt in bulk.

I. Merits of Natural Asphalt Roads. Clifford Richardson. II. Merits of Refined Asphalt Roads. Leroy M. Law. Slightly condensed from papers read at Worcester, Mass. (69368). 3500 w. Mun JI—April 6, 1916. Relative merits of the two types.

City Makes Money by Purchasing Plant and Laying Its Own Asphalt Paving (70964). Clarence E. Ridley. 2500 w. E R—June 10, 1916. Cost, at Flint, Mich., of day-labor methods.

See also same heading, under *Materials of Construction*.

Asphalt Block

Methods of Laying Asphalt Block Pavements (72943 A). Daniel J. Hauer. Ills. 1500 w. Cnr—Sept. 1, 1916. Comments on sand vs. cement mortar cushion.

Asphalt Plant

Operating Manhattan Asphalt Plant (65818). William Goldsmith. Abstract of part of paper before Munic. Engrs. of City of N. Y. Ills. 1500 w. Munic Jour—Nov. 18, 1915. Plant and its work.

Portable Asphalt Plants for Country Roads and City Streets (73794). George D. Steele. Ills. 6500 w. B R & S—Oct., 1916. Serial, 1st part. Descriptive.

Bituminous

Factors in Construction of Bituminous Pavements (70258). Lester Kirschbraun. Ills. 3500 w. B R & S—May, 1916. Plants and their equipment.

Recent Developments in Bituminous Macadam and Bituminous Concrete Pavements (70350). Arthur H. Blanchard. 4000 w. Cn E—May 11, 1916. Improvements during two years.

Consult Classification of the Index. See page 7.

Bituminous

Teren van wegen en daarvoor gebruikte inrichtingen te 's-Gravenhage (70195 B). E. Jacobs. Ills. 3500 w. Ing—April 29, 1916. Methods and machines for tarring roads in The Hague.

Essential Physical Properties of Sand, Gravel, Slag and Broken Stone for Use in Bituminous Pavements (68036). Francis P. Smith. Read at Columbia Univ. 4000 w. Cn E—Feb. 10, 1916.

A New Bituminous Pavement (67846 B). Ills. 1200 w. Mun J1—Feb. 3, 1916. (Special.) Mineral salts to strengthen and toughen asphalt.

The Hot-Mix Method of Bituminous Construction, Using an Asphaltic Binder (68968). Francis P. Smith. Read before Can. Road Cong. 4500 w. Cn E—March 16, 1916. Uses and methods.

The Functions Performed by Stone in the Bituminous Concrete Pavement (68923). R. B. Gage. 1800 w. G R—March 4, 1916.

Methods for the Examination of Bituminous Road Materials (67371 N). Prévost Hubbard and Charles S. Reeve. Ills. 48 pp. U S D A, No. 314—Dec. 10, 1915. Details of tests.

Bituminous Roads (69365). Robert C. Muir. Read before Conf. on Road Construction. 2500 w. Cn E—April 6, 1916. Construction methods.

Bituminous Paving Plants (69533). L. Kirschbraun. 3500 w. Cn E—April 13, 1916. Efficiency of various types of plants.

Putting Macadam Roads in the Permanent Class (69348). Daniel T. Pierce. Ills. 1200 w. E & C—April 5, 1916. Extract from committee report to Nat. Conf. Penetration method.

Construction Field Books for Bituminous Macadam Highways (69350). J. T. Crawford. 1200 w. G R—April 1, 1916. Objects of books.

What the Highway Engineers Should Know About Bituminous Materials (69467 A). Prevost Hubbard. 7500 w. C C E—March, 1916. Important points and processes.

Building and Maintaining Roads with Refined Tar (69534). John S. Crandell. Abstract from address at Int. Road Cong. 1800 w. Cn E—April 13, 1916. Construction methods.

Aggregates and Fillers for Bituminous Road Construction (65630 A). Plate. E. J. Lovegrove. 1000 w. Surveyor—Oct. 22, 1915. Need of careful selection and grading.

Bituminous Pavements (73418 B). Monroe L. Patzig. Ills. 4000 w. Iowa Eng Soc—Feb., 1916. Considers the binding material and mineral aggregate.

ROADS AND PAVEMENTS

Brick

Bituminous Road Construction in Sutton, Surrey (71173 A). W. Hedley Grieves. 3300 w. S M C E—June 9, 1916. From paper before Inst. of Munic. & Co. Engrs. Methods and costs.

Bituminous Road Surfacing Scheme (71160 N). A. Dryland. Ills. 3000 w. I M C E, J1—June 1, 1916. Conditions, method, plant, cost, etc.

See Tars under *Materials of Construction*.

Bituminous Materials

Limitations of Results of Tests of Bituminous Materials (68781). Charles N. Forrest. Ills. 4500 w. B R & S—March, 1916. Lecture at Columbia University.

Essential Physical Properties of Sand, Gravel, Slag, and Broken Stone for Use in Bituminous Pavements (68780). Francis P. Smith. 3500 w. B R & S—March, 1916.

Laying Concrete Highway with Bituminous Wearing Surface—Details of Operation and cost (68534 A). Ills. 2000 w. Mun E—March, 1916. Work in California.

Block

A Study of Cushions for Pavements of the Block Type (67428). Maurice B. Greenough. 3000 w. E & C—Jan. 19, 1916. Read before the Am. Assn. for the Adv. of Science. Materials used; problems.

Brick

Brick Streets and Roads (68921). H. E. Breed. 2500 w. G R—March 4, 1916. Methods and cost in New York State.

Construction and Maintenance of Brick Roads and Streets (68969). J. Duchastel. Read before Can. Road Cong. Ills. 2500 w. Cn E—March 16, 1916. In Outremont, P. Q.

Recent Advancement in the Construction of Brick Pavements (67066). William C. Perkins. Read before Am. Assn. for Adv. of Sci. 2500 w. E & C—Jan. 26, 1916. Progress with reference to subgrade, cushion course, cushionless construction and brick surface.

Some Radical Changes in Brick-Pavement Construction (67585). P. C. McArdle. Ills. 1800 w. E N—Jan. 27, 1916. Thin concrete foundation advocated.

Some Brick Paving Lessons Learned in Overcoming Faults of Original Design, Greenville, Texas (65821). A. D. Duck. Abstract of paper before Am. Soc. of Munic. Imp. 2200 w. Engng & Con—Nov. 17, 1915. Details of work.

Essential Details of the Construction and Maintenance of Brick Pavements (71622). William A. Howell. Lecture at

Caliche

ROADS AND PAVEMENTS

Concrete

Columbia Univ. 4000 w. B R & S—July, 1916. History, construction, maintenance.

Modern Brick Road Construction (71218). From paper by H. E. Bilger. 2000 w. E & C—June 21, 1916. Particulars.

Strength of Highway Surfacing. Brick (71427 A.). Charles A. Newhall. Ills. 3000 w. P N S E, Pro—March-April, 1916. Relative strengths of pavements.

Brick Pavement Construction by Day Labor (66824). John C. Hiteshew. Ills. 3000 w. Mun JI—Dec. 30, 1915. Methods and costs.

Building a Monolithic Brick Road near Monticello, Ill. (66282). Chas. P. Stivers. Ills. 1500 w. Cnr—Dec. 15, 1915. Details of procedure.

Methods of Brick Pavement Construction (68017). Ills. 7000 w. G R—Feb. 5, 1916. Recent development of "monolithic" type and cement-sand cushion.

Brick Roads (72888 N). Vernon M. Peirce and Charles H. Moorefield. Ills. 40 pp. U S D A, Bul 373—Aug. 25, 1916. Proper construction.

An Analysis of the Advantages of Monolithic Brick Pavement (69345). Maurice B. Greenough. Ills. 2000 w. E & C—April 5, 1916. Extracts from paper before Ohio Eng. Soc.

See also Paving Brick, under *Materials of Construction*.

Caliche

Caliche Roads; A New Type of Construction in Arizona (70056). Ills. 1100 w. E N—May 4, 1916. Novel material.

California

Suggested Routes for the Mountain Laterals of the California State Highway (69418). Map. 1500 w. W E—April, 1916. Existing and proposed.

Pavement Construction in Burlingame, California (71699). Eric Wold. Ills. 2000 w. W E—July, 1916. Paving and storm sewer contract now under way. Unusually low bids.

Columbia River Highway

The Columbia River Highway (70291). George C. Warren. Ills. 1500 w. Cnt—May, 1916. Serial, 1st part.

The Columbia River Highway in Oregon (67005). Ills. 2500 w. G R—Jan. 1, 1916. Broad semi-technical description.

Concrete

Concrete Road Conference Adopts Code of Recommended Practice (68323). 4000 w. E R—Feb. 26, 1916. Standards.

Nation-Wide Canvass by Experts Sifts Out Best Methods of Concrete Road Building (68327). 6500 w. E R—Feb.

26, 1916. Abstracts of committee reports at Nat. Conf. in Chicago.

Good Practice in Concrete Road Construction (68289). 2500 w. E & C—Feb. 23, 1916. Report of Committee on Resolutions of the Nat. Conf.

Kinks in Concrete Road and Pavement Construction (68125 B). C. D. Franks, with discussion. 6500 w. Ind Eng Soc—1915. Developments.

Four Examples of Concreting Gang Organization for Road Work (68286). 2000 w. E & C—Feb. 23, 1916.

Concrete Road-Building Methods Yield Profits in Cash Instead of in Plant (68054). H. E. Breed. Ills. 1500 w. E R—Feb. 12, 1916. Mechanical handling.

Advanced Practice With Economical Results on the Allentown-Easton Road (67942). Ills. 1500 w. C C A—Feb., 1916. Concrete construction.

Tar-Coated Concrete Pavement in Ann Arbor, Mich. (68369). Manley Osgood. 2400 w. E N—Feb. 24, 1916. Effects of reducing first cost.

Reclaiming Stone from Old Macadam for Concrete Base (67978). Stanley E. Bates. Ills. 1200 w. E & C—Feb. 9, 1916. On recent Chicago jobs.

A Few Practical Considerations in the Construction of Concrete Roads (72640). William F. Long. Ills. 3500 w. U S E—July, 1916. Important points of construction.

Colonel Sohler Tells of California's Concrete Roads (66148). 1500 w. E R—Dec. 4, 1915. Construction and maintenance.

Coleman du Pont Concrete Road (66833). Ills. 1400 w. E N—Dec. 30, 1915. Methods of construction in Delaware.

Experimental Concrete Roadway, Sacramento, California (66546). A. J. Cleary. Ills. 1500 w. E N—Dec. 16, 1915. Various thicknesses, plain and reinforced.

A New and Different Specification for Concrete Roads (65822). Presented at meeting of Am. Soc. of Munic. Imp. 2500 w. Engng & Con—Nov. 17, 1915. For precise proportioning; worked out by W. W. Crosby.

Method of Constructing Concrete Road in Freezing Weather (65503). H. Colin Campbell. Ills. 1200 w. Engng & Con—Nov. 3, 1915. Precautions.

Pennsylvania Builds Concrete Road as Object Lesson (65331). Ills. Eng Rec—Oct. 30, 1915. Construction methods.

Recent Developments in the Building of Concrete Roads (69367). William D. Uhler. Ills. 1800 w. Mun JI—April 6,

Consult Classification of the Index. See page 7.

Concrete

ROADS AND PAVEMENTS

Concrete

1916. Conclusions from results on 12-mile model.

Various Aggregates in Test Concrete Road (69831). Ills. 1200 w. E R—April 22, 1916. Philadelphia tests latest theories and practice.

Method and Cost of Constructing Concrete Service Test Road at Philadelphia, Pa. (69902). William H. Connell. 3000 w. E & C—April 26, 1916. Advance sheets of 1915 annual report.

A Study of Cracks in a Concrete Roadway at Indiana University (69475). Ulysses S. Hanna. Diagram. 1500 w. E & C—April 12, 1916. Read before Ind. Eng. Soc.

Thirty-six-Mile Concrete Road, Built by Day Labor, Will Link Canadian Cities (69550). H. S. Van Scoyoc. Ills. 1800 w. E R—April 15, 1916. Toronto-Hamilton highway.

Methods of Construction on the Coleman-Dupont Concrete Road (69343). Charles Upham. Abstract of paper read before Am. Concrete Inst. Ills. 3000 w. E & C—April 5, 1916. Drainage, grading, construction, finishing, etc.

Experience with Bitumen Carpeted Concrete Pavement in Ann Arbor, Mich. (69749). Manly Osgood. Read before Mich. Eng. Soc. Ills. 2500 w. E & C—April 19, 1916. Tared concrete pavement; advantages and disadvantages of the type.

Concrete Road Construction in Oakland County, Michigan (69445 A). M. De Glopper. Ills. 5500 w. Mun E—April, 1916. Methods.

Road Conference Considers 17 Committee Reports and Recommends Practice (69007). 14000 w. Crt—March, 1916. Serial, 1st part. Various phases.

Apparatus for Measuring the Wear of Concrete Roads (68643). A. T. Goldbeck. Ills. 1100 w. E & C—March 8, 1916. Details of instrument and application.

Concrete Highways Subjected to Extremes of Temperature (68696). H. S. Van Scoyoc. 1600 w. Cn E—March 9, 1916. Effects based on observations.

The Proper Use of Concrete Gravity Chutes (68583 A). W. H. Insley. Ills. 1500 w. Mun E—March, 1916. Economic operation.

Monolithic Concrete Curb and Pavement in Arcade, N. Y. (68667). E. J. Doyle. Ills. 1900 w. E N—March 9, 1916. Details of design and construction.

Concrete Pavement with Bituminous Top (68932). H. J. Hanmer. Ills. 1200 w. Mun JI—March 16, 1916. Gloversville, N. Y. Methods.

Good Results from Unusual Concrete Paving Methods in Sioux City, Iowa (69008). T. H. Johnson. From discussions at Nat. Conf. 2000 w. Crt—March, 1916.

Proportioning of Concrete for Road Work; Suggestions for Improvement and Obstacles in the Way (67224). W. W. Crosby. 2500 w. E & C—Jan. 12, 1916. Present situation, with suggestions.

Pelham Manor Concrete Road (67193 A). Charles A. Mullen. Ills. 1800 w. Mun E—Jan., 1916. Design and construction; thin bituminous wearing surface.

Water Supply for Concrete Pavement Construction (70286). 2500 w. E & C—May 10, 1916. Quantity, Conveyance and cost.

Organization as Influenced by Plant of Concreting Gangs for Road Construction (70595). Halbert P. Gilette. Part of report to Nat. Conf. on Concrete Road Building. 2500 w. E & C—May 24, 1916. Examples of gang organization.

The Easton-Allentown Concrete Road: An Exceptional Example of Modern Road Engineering (70597). William D. Uhler. Read before Am. Road Bldrs. Assn. Ills. 1800 w. E & C—May 24, 1916. Methods of construction.

Concrete, Paving, Subgrade and Cracks (73419 B). A. H. Gilliland. 1300 w. Iowa Eng Soc—Feb., 1916. Causes of cracks.

Methods and Costs of Constructing Bituminous Surfaced Concrete Roads in California (73040). Ills. 1500 w. E & C—Sept. 6, 1916. Details from report of W. C. Howe regarding construction and costs.

I. The Concrete Roads of Wayne County, Michigan. George D. Steele. II. The Maintenance of Wayne County Roads. Edward N. Hines (73086). 6300 w. B R & S—Sept., 1916. Details of construction and maintenance.

Wear of Concrete Pavements Due to Abrasion of Mortar Coat. Also, Wear of Concrete Pavement Due to Scaling of Mortar Coat (73039). Diagrams. 2500 w. E & C—Sept. 6, 1916. Based on report by T. R. Aggard and C. B. McCullough. Life depends on correct proportioning of materials.

Concrete Road Construction in Maryland (71567 A). Ills. 1500 w. Cnr—July 1, 1916. Methods and equipment used.

Sioux City Concrete Pavements (72062). Ills. 3900 w. E N—July 27, 1916. Editorial résumé of methods which produced good pavements.

Concrete Road Building in Norwalk (70457). C. A. Betts. 1500 w. Mun JI

Consult Classification of the Index. See page 7.

Construction

—May 18, 1916. Comparison of streets with and without reinforcement.

Building Concrete Roads in Lake County, Ohio (70915 A). Homer P. Cummings. 3500 w. Mun E—June, 1916. Reasons for failures to obtain best results.

Hydrated Lime in Concrete Pavements (71119). Extracts from report of G. Cameron Parker. Ills. 2500 w. Cn E—June 15, 1916. Tests and conclusions.

The Manufacture of Concrete Flags as a Municipal Undertaking (71159 N). J. W. Tomlinson. 1500 w. I M C E, JI—June 1, 1916. Methods employed and results.

Construction

Contract and Day-Labor Road Construction Compared (69373). R. W. Acton. 1800 w. Methods, cost, and efficiency.

Notes on the Construction and Care of Earth, Gravel and Macadam Roads (69431). H. E. Bilger. 4000 w. B R & S—April, 1916. Changed conditions, requiring improved methods.

Economic Highway Construction; an Analysis of Roadway Sections (67225). F. W. Harris. Ills. 1200 w. E & C—Jan. 12, 1916. Width, location, building through swamps, etc.

Difficult Pavement Construction in Brooklyn (71502). Ills. 1500 w. Mun JI—June 29, 1916. Interesting methods.

Cutting Haulage Cost in Road Work to Seven Cents per Ton-Mile (71657). G. N. Lamb. Ills. 1800 w. E & C—July 5, 1916. Machinery for producing and transporting road metal.

Efficient Plant Used in Excavating Gravel for Road Work (71565 A). Ills. 2500 w. Cnr—July 1, 1916. Small drag-line and loading outfit.

Construction Methods

Efficiency in Main Road Construction (68178 N). 2500 w. Cw E—Jan., 1916. Victorian County Roads Board report.

Construction Methods on the Toronto and Hamilton Highway (68387). H. S. Van Scoyoc. Ills. 1200 w. Cn E—Feb. 24, 1916. Methods, materials, plant.

Road Construction as Governed by Traffic Requirements (68209). Robert C. Muir. 2800 w. Cn E—Feb. 17, 1916. From paper at Toronto conference.

Methods and Costs of Construction of Concrete Pavements at Tonawanda, N. Y., (67976). A. F. Comstock. Read before Ill. Soc. of Engrs. & Survs. 2500 w. E & C—Feb. 9, 1916.

Contract Work

Millions for Paving Controlled by Handful of Pins (66382). William H. Connell. Ills. 2500 w. E R—Dec. 11,

ROADS AND PAVEMENTS**Grading**

1915. Planning board to classify highway contract work, Philadelphia.

Crowning

Paving Crown Best Distributed by Hyperbolic Curve (65339). Clark R. Mandigo. 1500 w. Eng Rec—Oct. 30, 1915. New formula developed in Kansas City.

Damaged Pavements

Pavement Damage Calls for Truck-Weight Restrictions (74054). E. W. Stern. Ills. 1500 w. E R—Oct. 21, 1916. Injury to asphalt and granite block.

Delaware

The Coleman du Pont Road (72658 N). Charles M. Upham with discussion. 12 pp. A R B A, Pro—1916. Information concerning this road through the length of Delaware.

Drainage

Drainage and Preparation of Subgrades (70259). John H. Huber. 5000 w. B R & S—May, 1916. General review; concrete examples of poor drainage.

Earth Roads

Earth Road Construction in Murray County, Minnesota (72230). Ills. 1500 w. E & C—Aug. 2, 1916. From paper by P. L. Minder, describing system.

Federal Aid

Office of Public Roads Prescribes Rules for Federal-Aid Appropriations (73620). 2000 w. E R—Sept. 30, 1916. Main features of approved rules.

Forest Roads

Forest Roads as Provided for in the Federal Aid Road Act (73336). Charles H. Kendall. 1500 w. U S E, JI—Aug., 1916. Outlines the policy which will govern the expenditure of \$10,000,000.

Foundations

Drainage and Foundation Problems Due to Soil and Other Geological Conditions (72324). Charles J. Bennett. Lecture at Columbia Univ. 4000 w. B R & S—Aug., 1916. Relation of subsurface water to the foundations of the road.

Foundations for Road and Street Pavements (72657 N). Joseph W. Hunter, with discussion. 12 pp. A R B A, Pro—1916. Natural and artificial foundations.

Pavement Foundations (70174). W. W. Crosby. 6 pp. Eng Club Balt, JI—May, 1916. General considerations.

Glutrin

A Glutrin Bound Macadam Road (69429). C. J. Knisely. 3000 w. B R & S—April, 1916. Construction and results.

Grading

Grading and Foundation Work in Oak Park, Ill. (70802 A). Charles P. Stivers. Ills. 2200 w. Cnr—June 1, 1916. Comparison of methods used.

Consult Classification of the Index. See page 7.

Granite**ROADS AND PAVEMENTS****Highways****Granite**

Granite Pavement Construction in Brooklyn, N. Y. (73044 A). Ills. 1000 w. Mun E—Sept., 1916. New labor-saving machines and their use.

Notes on Methods and Costs of Grouting Granite Block Pavement (65504). 2000 w. Engng & Con—Nov. 3, 1915. Examples representing grouting practice.

Motor Trucks Ruin Improved Granite-Block Pavement (73860). Ills. 1000 w. E N—Oct. 12, 1916. New pavement on 42d St., New York, broken by heavy truck traffic.

Gravel

Methods of Maintenance of New Hampshire Gravel Roads (68645). Frederick E. Everett. From paper before Am. Road Bldrs' Assn. 700 w. E & C—March 8, 1916. Patrol system.

Roads at Low Cost for Moderate Traffic (68924). F. E. Everett. 2500 w. G R—March 4, 1916. Construction and maintenance of gravel roads.

Construction of Gravel Roads by the Feather Edge Method (70289). H. E. Bilger. 2500 w. E & C—May 10, 1916. Extract from paper read at Kansas conference.

Experiments with Gravel Roads in Iowa (66009). T. R. Agg. Ills. 2500 w. Eng Rec—Nov. 27, 1915. Details of construction.

Haulage Costs

Comparative Costs of Hauling Gravel by Team and by Tractor for Road Work (69347). O. L. Kipp. Read before Minn. Engrs' and Survs' Soc. 1500 w. E & C—April 5, 1916. Tractor proves to be the cheaper.

Highway Administration

The Administration of a County Road System (68557). G. Cameron Parker. 2500 w. Cn E—March 2, 1916. Suggestions.

Highway Construction

Organization as Influenced by Physical Conditions of Concreting Gangs for Road Construction (68935). William F. McVaugh. 1500 w. E & C—March 15, 1916. From committee report of National Conference on Concrete Road Building.

Highway Engineers

Enlarged Field for Highway Engineers (67192 A). 1700 w. Mun E—Jan., 1916. Demand for experienced men.

Highway Maps

Maps and Plans for Highway Engineers and Superintendents (68694). T. M. De Blois. Read before Conference on Road Construction, Ontario. 1500 w. Cn E—March 9, 1916. Importance, uses, etc.

Highway Material

Disintegrated Gravel, 1000-Mile Tour Shows, Is Best Natural Highway Material in Colorado (73921). W. W. De Berard. Ills. 3500 w. E R—Oct. 14, 1916. Abundance of road metal makes possible large mileage of good roads at low cost.

Highways

Improvements of Highways to Meet Modern Conditions of Traffic (72287 A). W. H. Schofield, with discussion. 4800 w. S M C E—July 21, 1916. Serial, 1st part. Need of strengthening foundations, improved drainage and better surfacing.

Improvements of Highways to Meet Modern Conditions of Traffic (72398 N). W. H. Schofield, with discussion. 12 pp. I M C E, JI—July, 1916.

Roads at Low Cost for Moderate Traffic (72656 N). F. E. Everett, with discussion. 14 pp. A R B A, Pro—1916. Methods of construction and maintenance.

The Columbia Highway (72659 N). H. L. Bowlby. 10 pp. A R B A, Pro—1916. Features of construction of this fine scenic highway of the Pacific Coast.

Highway Problems of the State of Pennsylvania (71066 A). William D. Uhler. Ills. 3000 w. F I, JI—June, 1916. History, development, maintenance, cost, etc.

Constructing a New York State Road (71084). Ills. 1000 w. Mun JI—June 15, 1916. Monticello-Bloomington road. Macadam surface on heavy base.

Structural Features of a Great Scenic Highway (70979). A. A. Rosenthal. Ills. 1800 w. Cnt—June, 1916. Difficult work on Columbia River highway, Oregon.

Hamilton Entrance of Toronto-Hamilton Highway (71801). E. Howard Darling. Ills. 1500 w. Cn E—July 13, 1916. Relative merits of alternative routes.

Construction and Maintenance of Roads in the Arid West (73199). Ills. 3400 w. E N—Sept. 14, 1916. Notes on road building materials and construction under adverse climatic conditions.

Estimating the Cost of Highway Construction (73834). 3000 w. W E—Oct., 1916. From report of committee to 2d Nat. Conf. on Concrete-Road Building.

Rural Post Roads as Provided for in the Federal Aid Road Act (73997). Charles H. Kendall. 1000 w. U S E, JI—Sept., 1916. Factors of apportionment to states for the fiscal year 1917, with rules and regulations.

The State Highways of California (73833). Eric Wold. Ills. 3000 w. W E—Oct., 1916. Summary of work done.

Consult Classification of the Index. See page 7.

Holland

Economics of Highway Engineering (69464 A). L. I. Hewes. Ills. 2500 w. C C E—March, 1916. Administration, cost, finance, traffic, etc.

Rational Method of Selecting Types Evolved for a Comprehensive County Road System (69827). William W. Marr. Ills. 3000 w. E R—April 22, 1916. Five fundamental principles of design which should be followed.

Paved Highways and National Defense (69900). P. S. Bond. 1200 w. E & C—April 26, 1916. Usefulness under war conditions.

Open Scenic Highway Over Continental Divide in Southwestern Colorado (73442). Ills. 1800 w. E R—Sept. 23, 1916. Mileage to Los Angeles shortened by Wolf Creek pass.

Planning for Future Traffic on Trunk Highways (73425). 2200 w. Mun JI—Sept. 21, 1916. Designing to meet changing conditions largely due to motor vehicles.

Public Road Mileage and Revenues in the Middle Atlantic States, 1914 (73301 N). 27 pp. U S D A, Bul 386—Sept. 11, 1916. Compilation of statistics and factors affecting road improvement in each state.

Solving Louisiana Highway Improvement Problems (73385). M. C. Huckaby. Ills. 1300 w. E N—Sept. 21, 1916. Difficulties in providing county roads.

Construction and Maintenance of Rural Highways (65666 A). Alfred Dryland. Read at Int. Engng. Cong. 2500 w. Surveyor—Oct. 29, 1915. English conditions.

Holland

Rijksstraatwegen (65411 B). T. Huijtema. 2500 w. Ingenieur—Oct. 16, 1915. Brief account of government road construction and maintenance.

Het provinciale wegennet in Overijssel (70179 B). A. Van Linden van den Heuvel. Ills. 7000 w. Ing—April 1, 1916. Road system of province of Overijssel in Holland.

Hudson Valley

Alpine Roadbuilding in the Hudson River Valley (65947). Ills. 700 w. Eng News—Nov. 25, 1915. Roadbed on a mountain side carried by dry masonry retaining walls.

Hydrated Lime

Hydrated Lime in Concrete Road Construction (66241). Ills. 1500 w. G R—Dec. 4, 1915. Review of success thus far.

Improvements

General Principles of Road Improvement (68037). W. Muir Edwards. 1600 w. Cn E—Feb. 10, 1916. Serial, 1st part. Economic principles.

ROADS AND PAVEMENTS**Maintenance****Johannesburg**

Road Construction and Maintenance in Johannesburg (65631 A). G. S. Burt Andrews. From a paper before S. African Soc. of Civ. Engrs. 1700 w. Surveyor—Oct. 22, 1915. Serial, 1st part. Conditions and disadvantages.

Law

The Legal Status of Highway Boundaries and Disposal of Surface Waters (72325). John C. Wait. Lecture at Columbia Univ. 6000 w. B R & S—Aug., 1916. Explanatory.

Lime

The Use of Hydrated Lime in Concrete-Road Building (65621). L. N. Whitcraft. 1500 w. W Engng—Nov., 1915. Defects and remedies.

London

The Paving of the Streets of London (69026 A). 2200 w. Enr—March 3, 1916. Information from 13th annual report.

Arterial Roads in Greater London (66815 A). W. R. Davidge. From a paper read before the Town Planning Inst. Short discussion. 2500 w. S M C E—Dec. 17, 1915. Present and future needs.

Los Angeles County

Highway Work in Los Angeles County, California (66240). 5000 w. G R—Dec. 4, 1915. Administration, construction and maintenance method.

Macadam

The Macadam Road System of Franklin County, Ohio (70257). George D. Steele. 7000 w. B R & S—May, 1916. Details.

Worn Macadam Road Repaired by Tar Spraying (72950). Robert H. McNeilly. Ills. 1200 w. E R—Sept. 2, 1916. Inexpensive equipment to distribute tar under pressure.

Construction Features of an Asphaltic Macadam Road in Massachusetts (71216). From paper by E. H. Townsend. Ills. 1500 w. E & C—June 21, 1916. Descriptive.

Thirty-Mile Macadam Automobile Road Built Through Maine Woods to Construct Dam (72564). Ills. 1500 w. E R—Aug. 19, 1916. Motor trucks cheaper than horses or railroad for hauling cement to inaccessible work.

The Destruction of a Macadam Road (72397 N). T. W. Arnall, with discussion. Ills. 15 pp. I M C E, JI—July, 1916. Effect of loads, wheels, etc., and remedies.

Maintenance

Patrol System Improves Condition of Dirt Roads 50 Per Cent at Low Cost

Consult Classification of the Index. See page 7.

Maintenance

(70378). E. B. Tourtellot. 1500 w. E R—May 13, 1916. In Iowa.

Lessons in Road Maintenance from New York State (70332). T. M. Ripley. 3900 w. E N—May 1, 1916. Types of construction now demanded.

Methods and Costs of Concrete Road Maintenance in Ohio (70288). A. H. Hinkle. 2200 w. E & C—May 10, 1916. Repairing various kinds of defects.

Road Maintenance (66711 A). George C. Scales. 1800 w. E C—Nov., 1915. Systems in United States.

Gravel Roads of New Hampshire; Patrol Maintenance (66352). Ills. 3300 w. E N—Dec. 9, 1915. Details, for heavy traffic.

Maintaining the Washington-Atlanta Highway (71141). 1500 w. E R—June 17, 1916. Organization and cost.

Methods of Repairing and Maintaining Roads (71145 A). Daniel J. Hauer. Ills. 1500 w. Cn—June 15, 1916. Use of tar compound, with results.

Practical Maintenance of Road Plants (70784). M. E. Fafard. Abstract of paper read before Can. Roads Cong. 3000 w. Cn E—June 1, 1916. Duties of instructor sent with road plant.

Road Maintenance, Materials and Methods (71290). William H. Connell. Read before 3d Can. & Int. Good Roads Cong. 1500 w. Cn E—June 22, 1916. Routine, general, and emergency maintenance.

Economical Methods in the Repair of Waterbound Roads (70807). John F. Gallier. 2000 w. B R & S—June, 1916. Fundamental principles and experience.

Road Maintenance in the Several States (69366). Ills. 16500 w. Mun JI—April 6, 1916. Symposium.

Patrol System, Gang System and Combination Patrol and Gang System of Road Maintenance in Maryland (69474). H. G. Shirley. 2500 w. E & C—April 12, 1916. Patrolman's duty; when system is satisfactory.

The Maintenance and Repair of New York State Highways (69428). Fred W. Sarr. 6000 w. B R & S—April, 1916.

Macadam Road Maintenance (71652). W. H. Huber. Read before Can. Int. Road Cong. 4500 w. Cn E—July 6, 1916. Suggestion for effective maintenance.

Methods and Cost of Treating Old Macadam Streets in Milwaukee, Wis. with Asphaltic Oil (71654). Stanley E. Bates. Ills. 1000 w. E & C—July 5, 1916. Method of application.

Material Hauling

Motor Trucks for Hauling Materials for Road Construction (70001 A). Ills. 3000 w. Cn—May, 1916. Fundamentals of operation.

ROADS AND PAVEMENTS**Palisades**

Efficient Gravel Hauling by Motor Truck on City Work (70002 A). Ills. 3000 w. Cn—May 1, 1916. Record of operation.

Mixing Plant

Concrete and Asphalt Mixing Plant Saves Its Cost in One Year (69560). George H. Binkley. Ills. 2000 w. El R JI—April 15, 1916. Remarkable economies achieved.

National Parks

United States Will Capitalize Its Scenery (65566). Ills. 1500 w. Eng Rec—Nov. 6, 1915. Development of national parks.

New York

Highway Work in New York (65534). From report of Henry W. Durham. Ills. 1500 w. Munic Jour—Nov. 4, 1915. Types of pavements for different streets.

Nova Scotia

Road and Bridge Construction and Maintenance in the Province of Nova Scotia (70349). Ills. 2500 w. Cu E—May 11, 1916. From report of Highways Division.

Oiling

Surface Oiling of Earth Roads. (67384 N). B. H. Piepmeier. Ills. 22 pp. Ill State Highway Dept Bul, No 11—Dec. 1, 1915. Outline and suggestions as to best method.

Road Oil Test for Loss on Heating Needs Revision (65567). Norman Chivvis. 1600 w. Eng Rec—Nov. 6, 1915. Wide variation in evaporation due to convection currents in heating ovens.

Oil Treatment for Highways (69351). W. R. Farrington. 3500 w. G R—April 1, 1916. Equipment and treatment of dirt roads, broken stone, and patching methods.

Methods and Cost of Oiling Earth Roads in Illinois (72229). Ills. 4000 w. E & C—Aug. 2, 1916. Information from a bulletin prepared by B. H. Piepmeier.

Ontario

Canadian Highways Development; with Notes Regarding Ontario's System (67105). William A. McLean. Abstract of paper read at Worcester, Mass. 3000 w. Cn E—Jan. 6, 1916. Past and present activities.

Ottawa

Bank Street Pavement, Ottawa (66125). Ills. 900 w. Cn E—Dec. 2, 1915. Type of construction and cost.

Palisades

Making a Road Up the Palisades (65829). Ills. 1700 w. Eng News—Nov. 18, 1915. Brick-paved road to carry heavy traffic on an easy grade up steep slopes.

Consult Classification of the Index. See page 7.

Pavements**Pavements**

Pavement Obstructions (73229). Ills. 1800 w. Mun JI—Sept. 14, 1916. Minimizing the objectionable features of coal hole covers, cross gutters, posts, poles, etc.

Street and Road Pavements, Their Design, construction, and Maintenance (73042 A). Ills. 4000 w. Mun E—Sept., 1916. Serial, 1st part. The present article is upon the design of brick pavements.

Comparative Values of Various Approved Forms of Street Pavements and Roads (70602). E. M. Re Qua. 2500 w. E & C—May 25, 1916. Made on basis of perfect pavement.

Paving

Planning and Organizing for Paving County Roads (72418). Ills. 2500 w. E N—Aug. 10, 1916. Methods used in Vermilion Co., Ill.

Preparing Streets of a Large City for Paving (72185). Daniel J. Hauer. Ills. 3000 w. Cnr—Aug. 1, 1916. Operations necessary in re-paving Baltimore.

Roads and Paving (72400 A). 4000 w. Eng—July 14, 1916. Serial, 1st part. Report by Henry Welles Durham. Street paving in European cities.

Some Paving Lessons Learned in Ann Arbor (71934 B). Manly Osgood. 2200 w. M E—1916. Experience with tarred concrete pavement.

Prorating Paving Cost Among Property Owners (71616). H. M. Talbott. Ills. 1200 w. E N—July 6, 1916. Practice in Owensboro, Ky.

Paving Materials

The Adaptability of Road Paving Materials to Different Conditions and Localities (68919). F. C. Pillsbury. 4500 w. G R—March 4, 1916. Conditions of climate and traffic.

Paving Specifications

Beloit's Experience with Open Paving Specifications (69905). H. W. Adams. 5800 w. Wis E—April, 1916. Experience with asphalt.

Paving Statistics

Paving Statistics of American Cities for 1915 (67854 B). 28 pp. Mun JI—Feb. 3, 1916. (Special.) Tabulation of amount, kind and cost of roadway and sidewalk paving.

Pennsylvania

The Old National Road in Pennsylvania (68018). John Russell Wilson. Ills. 2000 w. G R—Feb. 5, 1916. History and reconstruction of Cumberland Road.

Philadelphia

Accomplishments of the Philadelphia Bureau of Highways (70260). William H. Connell. 1600 w. B R & S—May, 1916. Serial, 1st part.

ROADS AND PAVEMENTS**Road Materials****Philippines**

Notes on the Principles Governing the Design of the Gravel and Macadam Highways of the Philippine Islands (73041). J. L. Harrison. Ills. 3500 w. E & C—Sept. 6, 1916.

Pike's Peak

Pike's Peak Highway, Colorado (66737). R. C. Hardman. Ills. 1000 w. E N—Dec. 23, 1915. Scenic road.

Pittsburgh

Pittsburgh's Streets (68016). Ills. 5000 w. G R—Feb. 5, 1916. General description.

Plank Road

Plank Roadway Laid Across Shifting Desert Sands (72124). Ills. 1200 w. E R—July 29, 1916. Road near Holtville, Calif.

Quebec

Road Improvement in the Province of Quebec (69102). Ills. 2000 w. Cn E—March 23, 1916. Increase in expenditure in 20 years.

Repairs

Street Repair in Cleveland, Ohio (65618 A). Ills. 4000 w. Munic Engng—Nov., 1915. Methods and results.

Re paving

Repaving in Cincinnati (73903). John Stanley Crandall. Ills. 1000 w. Mun JI—Oct. 12, 1916. Old granite blocks replaced by same blocks renapped and with other materials.

Resurfacing

Resurfacing Old Roads (70173). Wm. D. Uhler. 4 pp. Eng Club Balt JI—May, 1916. General considerations.

Road Contractors

A Contractor's Suggestion to Engineers and Inspectors (72655 N.) John H. Gordon with discussion. 8 pp. A R B A, Pro—1916. Importance of form of contract.

Road Materials

Discussion on Materials for Road Construction and on Standards for Their Test and Use (72825 D). 50 pp. A S C E, Pro—Aug., 1916. Discussion of Progress Report of Special Committee.

Methods for the Determination of the Physical Properties of Road-Building Rock (68899 N). Frank H. Jackson, Jr. Ills. 27 pp. U S D A, Bul 347—March 17, 1916.

The Care and Operation of Quarrying and Crushing Equipment (68559). R. M. Smith. 2000 w. Cn E—March 2, 1916. Read before Conf. on Road Construction.

Report of Committee D-4 on Road Materials (71436 N). Ills. 34 pp. A S T M—June, 1916. Proposed standard methods of testing, analysis, specifications, etc.

Consult Classification of the Index. See page 7.

Road Signs

Relation of Mineral Composition and Rock Structure to the Physical Properties of Road Materials (69781 N). Ills. 26 pp. U S D A, Bul 348—April 4, 1916. Microscopic analysis.

Road and Concrete Materials (69468 A). H. S. Mattimore, with discussion. Ills. 5000 w. C C E—March, 1916. Testing.

Road Materials of Texas (67051 N). James P. Nash. Ills. 70 pp. Univ Tex, Bul—Nov. 5, 1915. Methods of testing and results.

Progress Report of the Special Committee on Materials for Road Construction and on Standards for Their Test and Use (66728 D). 7500 w. A S C E—Dec., 1915.

Methods for the Examination of Bituminous Road Materials (66585 N). Prévoost Hubbard and Charles S. Reeve. Ills. 48 pp. U S D A, Bul 314—Dec. 10, 1915. Scheme of examination, tests, etc.

Road Signs

Road Direction Signs (72684 N). C. H. Cooper, with discussion. Ills. 8 pp. I M C E, JI—Aug., 1916. Plans proposed.

Road Space

Width and Allocation of Space in Roads (69317 A). F. Longstreth Thompson. From paper before Town Planning Inst. 3000 w. S M C E—March 17, 1916. Traffic considerations.

Road Traffic

Distribution of Traffic on a Rectangular System of Roads Analyzed (73790). E. W. James. 2500 w. E R—Oct. 7, 1916. How expenditures should be governed.

Road Work

Motor Trucks in State Road Work (72428). Ills. 1600 w. Mun JI—Aug. 10, 1916. Cost and economy of motor trucks on a seven to nine mile haul.

Contract and Day Labor Systems of Doing Road Work (69297). R. W. Acton. Read before Minn. Survs. and Engrs' Soc. 3300 w. Cnr—April 1, 1916. Conditions affecting choice.

St. Louis

Test Results Will Form Basis for Selecting Pavements in St. Louis (65337). Nelson Cunliff. Ills. 1500 w. Eng Rec—Oct. 30, 1915. Experiments with types of surfacing.

San Antonio

Paving in San Antonio, Texas (67844 B). E. A. Kingsley. Ills. 3500 w. Mun JI—Feb. 3, 1916. (Special.) City spending \$1,500,000.

San Francisco

The Boulevard System of San Francisco (70243 A). M. M. O'Shaughnessy. 1000 w. W E—May, 1916. Outline.

ROADS AND PAVEMENTS**Stone Block****Sand and Oil**

Discussion of "Sand and Oil Roads and Surfaces" (70319 B). 6500 w. B S C E, JI—May, 1916. By Messrs. Fletcher, Upham, Page, Hammersley, Keyes and Farrington.

Sand and Oil Roads and Surfaces (68152 B). W. R. Farrington. 5000 w. B S C E, JI—Feb., 1916. Layer and mixed work. Specifications.

Sand and Oil Road Construction Methods Improved by Massachusetts Commission (67863). 5000 w. E R—Feb. 5, 1916. From last report by William D. Sohler.

Side Hill

Location and Grading of Side Hill Roads (65704). E. W. Murray. Read before Regina Engng. Soc. 2500 w. Can Engr—Nov. 11, 1915. Methods.

Sidewalks

Sidewalks and Sidewalk Construction (73038). Ills. 2500 w. Mun JI—Sept. 7, 1916. Essentials of good sidewalks.

Slag

Quarrying, Crushing and Screening of Blast Furnace Slag (69430). George D. Steele. Ills. 3000 w. B R & S—April, 1916. Plant near Buffalo.

Slipperiness

Methods of Remedying Slipperiness on Surface Treated Macadam Roads (68145) Burr Powell Harrison. 1300 w. E & C—Feb. 16, 1916. Extract from lecture at Maryland Agri. Coll.

South Dakota

Lawrence County Roads and How It Was Done (66238 N). George V. Ayres. Ills. 1600 w. Pah Qt—Dec., 1915. Financing and methods of constructing in Black Hills.

Specifications

New Specifications of National Paving Brick Manufacturers' Association for Brick Pavements of Green Concrete and Sand-Cement Super-Foundation Types (73697). Ills. 1000 w. E & C—Oct. 4, 1916. Requirements.

Stone

Sizes of Stone (68779). A. H. Hinkle. 3500 w. B R & S—March, 1916. Relation to macadam road.

Stone Block

Recent Tendencies in Stone Block Pavements (69349). Charles F. Knowlton. 5000 w. G R—April 1, 1916. Methods in New England.

Limitations of Tests which Define the Essential Properties of Stone Block, Paving Brick, Wood Block, and Cement Concrete when Used in Pavements (71620). W. W. Crosby. Lecture at Columbia Univ. 7000 w. B R & S—July, 1916.

Consult Classification of the Index. See page 7.

Street Cleaning**Street Cleaning**

See same heading under *Municipal*.

Street Intersections

Methods of Fixing Curb and Sidewalk Grades at Street Intersections on Steep Gradients (69471). John Wilson. Extract from paper before Minn. Eng. Soc. Ills. 700 w. E & C—April 12, 1916. Methods explained.

Street Openings

The Development of the Street Opening Problem; Its Effect and Control (72654 N). N. S. Sprague, with discussion. 24 pp. A R B A, Pro—1916. On regulation, control and management of opening street pavements.

Streets

Practical Street Construction (67134). Ills. 3000 w. Mun JI—Jan. 6, 1916. Serial, 1st Part. Dependable methods.

Street Sweeper

The Gas-Electric Suction Street Sweeper (72205 A). W. S. Leggett. Ills. 1500 w. G E R—Aug., 1916. Construction, operation, and results of the "Way-cleanse" street sweeper.

Subgrades

Drainage and Preparation of Subgrades (69465 A). J. H. Huber, with discussion. 4000 w. C C E—March, 1916. General review.

Sulphite Liquor

The Use of Sulphite Liquor as a Road Binder (68385 N). John J. Cox. 3500 w. Mich Engr—Vol. 33, 1915. Investigation of availability.

Supervision

Cost of Engineering Supervision in Road Work (70454). Lamar Cobb. Extract from paper before Pan Am. Road Cong. 1200 w. E & C—May 17, 1916. Data from various states.

Automobiles in Road Supervision Cost Data (68318 N). E. W. James. 1000 w. U S D A. Tabulated data accumulated as result of supervising Washington-Atlanta highway.

Surfaces

Bituminous Wearing Surfaces for Old Macadam (73771). Ills. 3500 w. Mun JI—Oct. 5, 1916. Details of work in eastern states.

Surfacing

The Preparation and Use of Asphalt, Cut Back with Naphtha, for Road Surface Treatment (70092). Julius Adler. Read before Am. Assn. for Adv. of Sci. 2500 w. G R—May 6, 1916. In Philadelphia.

California's Bituminous Carpeted Concrete Roads Show Durability in Service, Report States Division Engineer W. C.

ROADS AND PAVEMENTS**Traffic**

Howe (70207). Ills. 1500 w. E R—May 6, 1916. Construction, first cost, maintenance.

Gravelled Roads (72550). Gabriel Henry. Read before Can. Cong. 3500 w. Cn E—Aug. 17, 1916. Drainage, foundation, gravel, maintenance, etc.

Surveying

Road Surveying cum Road Surveyor's Position (66073 A). W. J. Brooke. 1800 w. S M C E—Nov. 19, 1915. Triennial system; road materials, etc.

Test Pavements

Present Condition of Second Avenue Test Pavements (66830). Henry Willes Durham. 1900 w. E N—Dec. 30, 1915. Summary of experiments in New York.

Test Roads

Test Roads in Philadelphia (71650). Ills. 2000 w. Mun JI—July 6, 1916. Present condition of sections of service test road built three years ago.

Texas

Building a National Highway Across the State of Texas (70456). George O. Van Camp. Ills. 1800 w. M Rd—May 18, 1916. Scenes and historic places on Meridian road.

Four Construction and Thirteen Maintenance Gangs Care for McLennon County's Roads (72410). William C. Davidson. Ills. 1600 w. E R—Aug. 5, 1916. Details of system.

Tire Widths

Minimum Tire Widths for Good Roads (71765 A). Harold L. Hock. Ills. 2000 w. C C E—June, 1916. Explains need of eliminating the narrow tire.

Track Paving

Effects of Low Temperature on Paving in the Track Allowance (70359). Ills. 1200 w. El R JI—May 13, 1916. Damage at Seattle from lack of proper drainage.

Paving Along Street Railroad Tracks (70053). Ills. 2000 w. Mun JI—May 4, 1916. Importance of solid track construction. Suitable materials.

Special Types of Equipment Used on Car Track Paving (70000 A). Ills. 1500 w. Cnr—May 1, 1916. Unusual method of handling materials in Chicago.

Traffic

The Automobile and the City Plan (70967). Nelson P. Lewis. 2500 w. E R—June 10, 1916. Present tendencies and how they should be met.

Road Traffic (73219 A). 1500 w. Eng—Sept. 1, 1916. Editorial review of the 6th Annual Report of the Road Board.

Automobile Registration, Lincenses, and Revenues in the United States, 1915 (71865). 3000 w. U S D A, Circ. No. 59

Consult Classification of the Index. See page 7.

Wood

—July 6, 1916. Prepared by the Div. of Road Economics.

Wood

Wood as a Paving Material (68695). W. Kynoch. Abstract of paper before Canadian Lumbermen's Assn. 2500 w. Cn E—March 9, 1916. Treating paving blocks.

Wood Block

Report of Committee on Wood Block Paving (67462 N). 2000 w. A W P A—Jan., 1916.

Report on Present Representative Practice of Municipalities Covering Treatment and Installation of Creosoted Wood Block Pavements (67467 N). Frank W. Cherrington. 1000 w. A W P A—Jan., 1916. Tabulated report for leading cities of United States.

Report of Special Committee on Specifications for Preservative for Wood Paving Blocks (67466 N). Ills. 1200 w. A W P A—Jan., 1916. Endorses specification presented by A. W. Dow to the Am. Soc. of Munic. Imp. in Oct., 1915.

Proper Oil for Creosoting Wood Blocks for Paving (67516). P. C. Reilly. Ills. 7000 w. R R—Jan. 22, 1916. Mixtures used, their defects, physical properties, and tests.

Creosote Wood Block Pavements (69227). Andrew F. Macallum. Read before the 3d Can. & Int. Good Roads

WATER SUPPLY**Aqueducts**

Cong. 2500 w. Cn E—March 30, 1916. Materials and methods.

An Important Quality of Wood for Paving Purposes (69352). W. W. Crosby. Read before Am. Assn. for Adv. of Sci. 2200 w. G R—April 1, 1916. Suggests specifications based on consistency of wood.

The Treatment of Wood Paving Blocks (74183). Clyde H. Teesdale. 2500 w. Cn E—Oct. 26, 1916. Read before Am. Soc. of Mun. Imp. Conclusions from experimental results.

Report of Committee on Service Tests of Wood Block Paving (71253 N). With discussion. Ills. 3500 w. A W-P A—Jan., 1916. Reports from Newark, N. J.; Seattle, Wash., and Minneapolis, Minn.

Creosoted Wood Block Pavement (72366 A). F. P. Hamilton. Ills. Also discussion. 5500 w. L E S, Pro—Aug., 1916. Reviews use of wood pavements, construction, etc.

Wood Blocks for Street Paving, Their Treatment and Handling (70219 A). 1500 w. Mun E—May, 1916. Comparison of specifications at present under consideration.

Report of Special Committee on Specifications for Preservative for Wood Paving Blocks (71249 N). With discussion. 11800 w. A W-P A—Jan., 1916.

See also same heading, under *Materials of Construction*.

WATER SUPPLY**Aberdeen**

The Water Supply of Aberdeen (71730 A). Ills. 3500 w. Enr—June 23, 1916. Early history and various schemes proposed, with description of present works. 3800 w. Enr—June 23, 1916.

Accounting

See Water Works under **INDUSTRIAL MANAGEMENT, Finance and Costs**.

Air Lifts

See same heading under **MECHANICAL ENGINEERING, Hydraulic Machinery**.

Alabama

Impounded Waters of Alabama in Relation to Public Health (66527 N). Edgar B. Kay. 7500 w. A W A—Dec., 1915. Character, need of careful sanitary surveys.

Algae

The Effect of Algae on Bicarbonates in Shallow Reservoirs (66530 N). S. T. Powell. Diagrams. 1200 w. A W A—Dec., 1915. Tests showing rapid changes in chemical composition of water.

Alum

The Arsenic Content of Filter Alum (66521 N). Edward Bartow and A. N. Bennett. Short discussion. 3000 w. A W A—Dec., 1915. Methods of analysis and conclusions.

The Manufacture of Sulphate of Alumina at the Columbus Water Softening and Purification Works (66529 N). Charles P. Hoover. Also discussion. 3500 w. A W A—Dec., 1915. Plant for making alum to coagulate water.

Analysis

The True Object of Water Analysis (66531 N). Frank L. Rector. 700 w. A W A—Dec., 1915. Results of investigation.

Aqueducts

New Winnipeg Aqueduct Cracks from Foundation Settlement (73863). 2200 w. E N—Oct. 12, 1916. Extracts from consulting engineer's report.

Sixty-six Inch Steel Conduits for the Catskill Water Supply in Brooklyn

Consult Classification of the Index. See page 7.

Aqueducts

(73601 N). Eric T. King. Ills. 22 pp. B'klyn Engrs' Club—1916. Information particularly relating to the Queens Conduit.

Winnipeg Aqueduct Cracks Can Be Repaired Within Original Cost Estimate (73925). Ills. 2500 w. E R—Oct. 14, 1916. Consulting engineers' report.

Curves on Winnipeg Aqueduct Built with Straight Sections of Forms (66007). Ills. 1500 w. Eng Rec—Nov. 27, 1915. Careful planning, method of laying out.

Methods of Construction on Winnipeg Aqueduct (69419). H. L. Tilley. Ills. 2000 w. W E—April, 1916. Crossing muskeg swamps.

Reinforced Concrete Aqueduct (68174 N). Ills. 500 w. Cw E—Jan., 1916. In connection with Geelong (Vic.) sewerage.

Sanitary Features of Los Angeles Aqueduct (67258). Burt A. Heinly. Ills. 2000 w. Mun JI—Jan. 13, 1916. Favorable situation, large reservoirs.

See also Tunnels under *Construction*.

Assessments

Assessing Costs of Extensions in a Municipally Owned Plant (66523 N). D. A. Reed. Discussion. 4500 w. A W A—Dec., 1915. Methods, principles, results involved.

Auxiliary Supply

The Proposed Auxiliary Water Supply of Brockton, Mass (73365 D). Robert Spurr Weston, with discussion. 37 pp. N E W W A, JI—Sept., 1916. Present sources of supply, quality of water, consumption of water, purification, etc.

Baltimore

The Baltimore Water Supply (73338 A). J. Bosley Thomas. 1800 w. E C B, JI—Sept., 1916. Details of dam, filtration plant, etc.

Beverly, Mass.

See Salem.

Bombay

Bombay Water Supply (67520 A). Ills. 1200 w. S M C E—Jan. 7, 1916. History and increased capacity of works.

Boundary Waters

Investigation of the International Joint Commission Upon the Pollution of Boundary Waters (67996 B). Earle B. Phelps. Also discussion. 7000 w. W S E, JI—Nov., 1915. Report and conclusions.

The Work of the International Joint Commission on the Pollution of Boundary Waters (68384 N). F. Gardner Legg. 4000 w. Mich Engr—Vol. 33, 1915.

WATER SUPPLY

Brooklyn

The Brooklyn Water Supply (67405 D). William J. Laase. Also discussion. 2800 w. N E W W A, JI—Dec., 1915. Driven wells and infiltration galleries.

Cambridge, Ohio

The Reconstruction of the Municipal Water Works, Cambridge, Ohio (70318 B). W. J. Sherman, 4000 w. B S C E, JI—May, 1916. Engineering problems.

Camp Supply

Providing Water Supply for a Large Militia Camp (73203). Ills. 3000 w. E N—Sept. 14, 1916. Water and sanitary conveniences for 25,000 men provided in quick time.

Water Supply and Sewage Disposal of a Semi-Permanent Camp of a Division (70122 B). Francis C. Harrington. Ills. 30 pp. P M—May-June, 1916. Serial, 1st part. First section devoted to water supply.

Canada

The Water Powers of Canada (65934 A). Editorial review. 2500 w. Engng—Nov. 12, 1915. Serial, 1st part. Water supply, distribution, development.

Canadian Hydraulic Power Problems (65879). 2000 w. From a paper by C. H. Mitchell read at Int. Engng. Cong. Can Engr—Nov. 18, 1915. Water storage and ice conditions.

Card Records

Experience With a Card Consumers' Ledger (70566 N). W. E. Haseltine. Ills. 1500 w. A W W A, JI—June, 1916. Method: advantages in compactness, ease of handling and cost.

Catskill Aqueduct

Master Piles Eliminate Rangers in Deep Steel Sheet-Pile Trench (69547). Ills. 2000 w. E R—April 15, 1916. Methods at Staten Island end of Narrows siphon.

Shore End of Narrows Siphon Built in Open Trench Dredged to Depth of 50 Ft. (69830). Ills. 1500 w. E R—April 22, 1916.

The Present Status of the Catskill Water Supply for New York City (67397 D). J. Waldo Smith. Ills. 700 w. N E W W A, JI—Dec., 1915.

Chemical-Hydrometry

See Flow under CIVIL ENGINEERING, *Measurement*.

Chlorination

Chlorinating the Water-Supply of Greater New York (73054). T. D. I. Coffin. Ills. 1300 w. E N—Sept. 7, 1916. Dunwoodie plant, the largest chlorine-control plant in the world.

Chlorination

Consult Classification of the Index. See page 7.

Cleveland, O.**WATER SUPPLY****Dams**

Water Chlorination Experiences at Toronto, Canada (73325 A). F. Adams. 1500 w. A J I P H—Aug., 1916. Difficulties and methods.

Some Aspects of Chlorination (70952). Joseph Race. 2200 w. Cn E—June 8, 1916. Read before Am W-Wks Assn. Mechanical admixture; effect of temperature, etc.

Cleveland, O.

Cleveland Water-Supply To Be Purified and Softened (74021). Ills. 2000 w. E N—Oct. 19, 1916. A 150000-gal. plant.

Coagulants

Hydrated Lime Pays at Council Bluffs Settling Basins (73055). J. B. Thornell. Ills. 1800 w. E N—Sept. 7, 1916. Hydrated lime and alum have reduced cost of coagulants, and improved results are secured.

Adaptation of Flour and Feed Blending Machine to Feeding Coagulants (73851). W. T. McClenahan. Ills. 2000 w. E & C—Oct. 11, 1916. Design and installation at New Kensington, Pa.

Colorado River Basin

Surface Water Supply of the United States, 1913. Part IX. Colorado River Basin (68501 N). Nathan C. Grover, Robert Follansbee, E. A. Porter, and G. A. Gray. 250 pp. U S G S—Water Sup. Paper 359.

Combined Plant

Combine Waterworks Intake and Pumping Station for Standard Oil Refinery (72561). Ills. 3000 w. E R—Aug. 19, 1916. Why the combination is employed. Description.

Conduits

Pressure Test Shows Little Leakage from Huge Molded Concrete Pipe (65334). Ills. 1500 w. Eng Rec—Oct. 30, 1915. Baltimore test. Loss only one-third amount allowed.

Repairing a Submerged Water Main (65552). James Hamilton. Ills. 1000 w. Can Engr—Nov. 4, 1915. Edmonton water-supply; main in South Saskatchewan River.

Building Invert of Milwaukee Intake Tunnel (65543). Lee G. Warren. Ills. 900 w. Eng News—Nov. 4, 1915. Built after arch and side walls.

Corrosion

Engineer Reports on Corrosion of 350-Mile Australian Steel Pipe Line 12 Years Old (74057). 3000 w. E R—Oct. 21, 1916. Greatest deterioration where conduit is buried in earth.

Croton Watershed

Area of Croton Watershed Is Corrected (73791). 1500 w. E R—Oct. 7, 1916.

Old figure of 360.44 sq. mi. is superseded by 376 sq. mi.

Cubic Performance

See same heading under *Measurement*.

Dam Failure

Irrigation Headworks Repair and Dam Failure (70905). W. G. Bligh. Ills. 1700 w. E N—June 8, 1916. Reconstruction work near Medicine Hat, Alta.

Dams

Building the Rolling-Crest Dam Across Grand River (71783). Ills. 3300 w. E N—July 13, 1916. Construction details.

Dam No. 5, Coosa River: The Problems of Location and Construction (71963 B). D. M. Andrews. Ills. 15 pp. P M—July-Aug., 1916.

Investigations for Dam and Reservoir Foundations (71507). Caleb Mills Saville. Ills. 6000 w. E N—June 29, 1916. Details of practice recommended.

Large Roller-Crest Dam, Grand Valley Project, Colorado (71612). F. Teichman. Ills. 2100 w. E N—July 6, 1916. Details of design.

The Arrowrock Dam (71515 A). H. A. Lawson. 800 w. E C St L, JI—May-June, 1916. Brief outline of construction.

Arched Gravity Dams to Be Built at Lower Otay and Barrett Sites (72463). Ills. 1500 w. E R—Aug. 12, 1916. San Diego adopts section submitted by M. M. O'Shaughnessy.

Designing an Earth Dam Having a Gravel Foundation, with the Results Obtained in Tests on a Model (72770 D). 16 pp. A S C E, Pro—Aug., 1916. Continued discussion of paper by James B. Hays, Jun.

Three Million Yards Being Pumped to Build Calaveras Dam, 240 Feet High, by Hydraulic Method (72560). G. A. Elliott. Ills. 3300 w. E R—Aug. 19, 1916. Highest earthfill structure yet undertaken. Chosen because safer against earthquakes.

Upstream Face of a Rockfill Dam Sealed with a Sliding Concrete Apron (72719). Ills. 1800 w. E R—Aug. 26, 1916. California dam equipped with unusual up-stream face.

Concrete Dam Far from Railroads Built Largely with Materials at Hand (72949). Ills. 1600 w. E R—Sept. 2, 1916. Conditions governing design.

Construct Dams by Hydraulic Method with Minimum of Cost, Labor and Equipment (73081). Cyril Wigmore. Ills. 2000 w. E R—Sept. 9, 1916. Builds dams of mine tailings in Arizona.

Earth Dam with Sheet-Steel Diaphragm and Cutoff (72931). Ills. 900 w. E N—Aug. 31, 1916. Special type across the Sevier River, Utah.

Consult Classification of the Index. See page 7.

Dams

WATER SUPPLY

Dams

More Proof of Need for Supervision of Dams (73256). Ralph Bennett. Ills. 1500 w. E R—Sept. 16, 1916. California structure that failed, violated principles of dam design.

Timber and Gravel Cofferdams on the Troy Dam (73201). D. A. Watt. Ills. 2600 w. E N—Sept. 14, 1916. Timber box cofferdams and gravel fills built in front of old dam before removing it.

Careful Construction to Make Large Dam for Youngstown, Ohio, Watertight. (73621). Ills. 3000 w. E R—Sept. 30, 1916. Details of construction.

Designing an Earth Dam Having a Gravel Foundation, with the Results Obtained in Tests on a Model (74138 D). Joseph Jacobs. 2500 w. A S C E, Pro—Oct., 1916. Continued. Discussion of James P. Hays' paper.

How Horsepower is Burned Up at Arrowrock Dam (73622). J. M. Gaylord, in *Reclamation Record*. 1200 w. E R—Sept. 30, 1916. How regulation is affected and spillway flow handled.

The Austin Dam—Waterproofing the Rock Foundation (73805 A). Frank S. Taylor. Ills. 3000 w. Mun E—Oct., 1916. Work to prevent leakage, with outline of history.

The Constant Angle Arch Dam (73736 A). Ills. 2500 w. Enr—Sept. 22, 1916. Lake Spaulding dam, California, and Salmon Creek dam, Alaska, considered as examples.

Are Rock-Fill Dams Safely Designed?—What Failure of Lower Otay Dam Teaches (70965). George S. Binckley. 2500 w. E R—June 10, 1916. Study of disaster.

Concrete-Capped Sheetpile Dam for Erie Canal (71083). Emile Low. Ills. 900 w. E N—June 15, 1916. Unique dam at Tonawanda, N. Y.

Designing an Earth Dam Having a Gravel Foundation, with the Results Obtained in Tests on a Model (70639 D). Ills. 6800 w. A S C E, Pro—May, 1916. Discussion of the paper by James B. Hays, Jr.

The Economical Top Width of Non-Overflow Dams (70641 D). 1500 w. A S C E, Pro—May, 1916. Discussion of William P. Creager's paper.

Building a Big Dam in Wilds (70329). Ills. 3600 w. E N—May 11, 1916. Concrete structure on upper St. Maurice River, Quebec.

The Action of Water Under Dams (66723 D). 1800 w. A S C E—Dec., 1915. Continued discussion of J. B. T. Colman's paper.

The Construction of Earth Dams (66548 A). R. L. Daugherty. Ills. 1000 w. S J I E—Dec., 1915. Calaveras dam.

Hydraulic Fill Method Used to Throw Temporary Dam Across Wide Stream (66792). Ills. 2000 w. E R—Dec. 25, 1915. Entire flow of Colorado River diverted into Imperial Valley temporarily to save crops.

Low Concrete Dam at Harrisburg Across Susquehanna River (66828). Ills. 2700 w. E N—Dec. 30, 1915. General description.

The Twin Cities' Interest in the High Dam (66455 A). Adolf F. Meyer. 5000 w. A E S—Nov., 1915. Source of power and effect on navigation.

Concrete and Fine Earth Form Core Wall in Rock-Fill Dam (66787). Ills. 1000 w. E R—Dec. 25, 1915. Trinchera Irrigation District, Colo.

The Medlow Dam (69704 A). Ills. 1600 w. Enr—March 24, 1916.

Unique Method Used to Build Rock-Fill Dam (69212). George W. Howson. Ills. 3000 w. E N—March 30, 1916. Strawberry dam, California. Three types of fill. Cableway method of placing stone.

Stresses in Masonry Dams (67549 A). N. W. Charde. Diagrams. 2000 w. U C J E—Dec., 1915. Algebraic and graphic solution.

The Constant Angle Arch Dam (68693). Ills. 4500 w. Cn E—March 9, 1916. Principles.

Examples of Constant Angle Arch Dams (69103). L. R. Jorgensen. Ills. 2500 w. Cn E—March 23, 1916. Two important installations.

Designing an Earth Dam Having a Gravel Foundation, with the Results Obtained in Tests on a Model (69077 D). James B. Hays. Ills. 5000 w. A S C E, Pro—March, 1916.

More Trouble at Austin Dam (69370). Ills. 1100 w. E N—April 6, 1916. Further disturbances.

The Medlow Dam, New South Wales (69223 N). Percy Allan. Ills. 1500 w. Cw E—March 1, 1916. Thinnest profile in the world.

The Economical Top Width of Non-Overflow Dams (66018 D). 3000 w. Am Soc Civ Engrs, Pro—Nov., 1915. Investigation showing that it lies between 10 and 17 per cent of the height.

The Action of Water Under Dams (66020 D). W. R. Baldwin-Wiseman. 500 w. Am Soc Civ Engrs, Pro—Nov., 1915. Continued discussion of J. B. T. Colman's paper.

Consult Classification of the Index. See page 7.

Dams**WATER SUPPLY****Filters**

The Kensico Dam (67527 A). Ills. 2500 w. Enr—Jan. 7, 1916. Details of construction and general information.

Kensico Reservoir (67398 D). Wilson Fitch Smith. Ills. 5000 w. N E W W A, JI—Dec., 1915. Details of construction and of plant.

Reservoir and Concrete Dam in Glacial Drift (67456). H. J. Langlois. Ills. 2500 w. E N—Jan. 20, 1916. Design and construction of hollow concrete dam at Plattsburg, N. Y.

Analysis of the Failure of an Earth-Fill Dam (67261). Guy Sterling. Ills. 4800 w. E N—Jan. 13, 1916. Hatchtown dam on Sevier River, Utah.

Comparative Particulars of Some Recent Dams (69023 A). Ills. 3000 w. Enr—March 3, 1916. Five recent undertakings.

Failure of the Lower Otay Dam (68722 A). Ills. 1600 w. W E—March, 1916.

Design of Rock Fill Dams (68668). Francis L. Sellev, Ralph Bennett, L. Jorgensen, and Horace W. King. 3900 w. E N—March 9, 1916. Symposium; also editorial, with special reference to Lower Otay dam.

Two Ohio River Dams Built in Two Seasons (68703). Ills. 4000 w. E R—March 11, 1916. Methods used on treacherous river.

Bear-Trap Weirs on the Ohio Rivers (68441). A. P. Connor. Ills. 1500 w. P E, C—March 1, 1916. Construction and details.

The Action of Water Under Dams (68357 D). Ills. 4000 w. A S C E, Pro—Feb., 1916. Continued discussion of Coleman's paper.

The economical Top Width of Non-Overflow Dams (68355 D). 800 w. A S C E, Pro—Feb., 1916. Discussion of Creager's paper.

Die Wehranlage in der Weser bei Bremen (68305 B). Kölle. Ills. 2000 w. Z V d I—Jan. 29, 1916. Serial, 1st part. General description of regulating dam in the Weser at Bremen.

Repairs to Defective Masonry on the Up-Stream Side of the La Boquilla Dam, Below the Water Surface (68295 A). Edwin Duryea, Jr. and G. G. Underhill. Ills. 4500 w. C C E—Feb., 1916. Emergency work in Mexico.

Otay Rock-Fill Dam Failure (67821). Charles Whiting Baker. Ills. 2500 w. E N—Feb. 3, 1916. Report of failure of dam for San Diego water-supply.

Failure of the Lower Otay Dam (68189). Roy A. Silent. Ills. 1800 w. E N—Feb. 17, 1916.

California Floods Wreck Otay Rock-Fill Dam (68060). Ills. 3000 w. E R—Feb. 12, 1916.

See also *Irrigation and Reclamation*.

Decolorization

Decolorization of Water by Storage (69494 D). Ralph H. Stearns, with discussion. 4500 w. N E W W A, JI—March, 1916. Results of a study of New England river waters.

Design

The Aesthetics of Water Works Design (74122 N). James W. Armstrong. 2500 w. A W W A, JI—Sept., 1916. Suggestions for beautifying buildings, etc.

Development

Recent Progress and Tendencies in Municipal Water Supply (67102). John W. Alvord. Abstract of paper read at Int. Cong. 3000 w. Cn E—Jan. 6, 1916. Serial, 1st Part. Reviews development of surface supplies and improvements in rapid sand filtration.

Disinfection

Progress of Water Disinfection in Maryland (73363 D). Robert B. Morse and Harry R. Hall. Map. 4000 w. N E W W A, JI—Sept., 1916. Use of hydrochlorite in connection with filtration.

Drainage

North Pacific Drainage Basins (73588). N. C. Grover, G. C. Baldwin, and F. F. Henshaw. Ills. 238 pp. U S G S—Water-Supply paper 393. 12th of a series of 14 reports giving results of measurement, of flow made in streams in the United States. Snake River basin.

Excelsior Springs, Mo.

Novel Water-Treatment Plant at Excelsior Springs, Mo. (68519). Ills. 1300 w. E N—March 2, 1916. Extensive treatment.

Fall River

Plan for Condensing-Water Supply for Fall River (65611). H. S. Knowlton. Ills. 1800 w. Power—Nov. 9, 1915. Four conduits in single structure.

The Fall River Concrete Conduits—Special Reference to a Three-Level Conduit of Unique Design (68644). Frederic H. Fay. Ills. 3000 w. E & C—March 8, 1916. Problem and solution.

Improvements to the Water Supply of the City of Fall River (69496 D). H. K. Barrows. Ills. 4000 w. N E W W A, JI—March, 1916. History and description of work.

Filters

Special Devices Installed to Improve Operation of New Mechanical Filters (73078). E. E. Harper. Ills. 2500 w. E R—Sept. 9, 1916. Chemical feed for

Consult Classification of the Index. See page 7.

Filtration

coagulation at Chillicothe, Mo., is automatically proportioned to the flow.

Filtration

Multiple Filtration Plant at Accra, Gold Coast Colony (65780 A). Plate. 3000 w. Engng—Nov. 5, 1915. Multiple filters and raw water reservoir of reinforced concrete.

Toronto Filtration Plant Construction (66000). Ills. 1000 w. Can Engr—Nov. 25, 1915. New 60000000-gallon drifting sand filter plant.

A Study of the Behavior of Rapid Sand Filters Subjected to the High-Velocity Method of Washing (67596 D). Joseph W. Ellms and John S. Gettrust. Ills. 6000 w. A S C E, Pro—Jan., 1916. Development of high-velocity method of washing rapid sand or mechanical filters.

Some Experiences in Washing Rapid Sand Filters in New Jersey (67227). Francis E. Daniels. From report of New Jersey State Board of Health. 900 w. E & C—Jan. 12, 1916. Washing gravity filters and pressure filters.

Installation de filtration d'eau à la piscine municipale Ledru-Rollin, à Paris (67050 B). J. Dejust. Ills. 1400 w. G C—Jan. 8, 1916. Filtration for municipal baths in Paris.

Ueber die Filterwirkung von Böden auf kolloidhaltige Wässer (66212 B). Karl Sack. 3500 w. G-I—Nov. 13, 1915. Serial, 1st part. Reprint from treatise, filtering efficiency of soils on colloid-bearing water.

Methods of Washing Slow Sand Filters (66522 N). John Gaub. Ills. 3000 w. A W A—Dec., 1915. Improvements and cost.

Pressure Chamber Equalizes Wash-Water Distribution at Miraflores Filters (66790). George C. Bunker. Ills. 2200 w. E R—Dec. 25, 1915. False bottom with feed pipes to filter bed.

Wooden Filters Prove Economical for Temporary Exposition Water Supply (66609). E. C. Eaton. Ills. 3500 w. E. R—Dec. 18, 1915. Economy by designing tanks and basins as timber flumes.

Good Engineering in Solving the Emergency Water Supply Problem of the Panama-Pacific International Exposition (66091). From a paper by E. C. Eaton. 2500 w. E & C—Dec. 1, 1915. Supply and purification works.

Pressure Filters (70570 N). Harold C. Stevens. 3000 w. A W W A, JI—June, 1916. Not entirely reliable.

Double Sand Filtration of Water at South Norwalk, Conn.—Removal of Organism, Tastes and Odors (69499 D).

WATER SUPPLY

Harry W. Clark, with discussion. 5000 w. N E W W A, JI—March, 1916. Details of successful plant.

Theory and Practice in the Filtration of Water (69887 N). Walter Clemence. Ills. 60 pp. I Mch E—April 14, 1916. Rapid and slow methods, favoring the latter.

A Study of the Behavior of Rapid Sand Filters Subjected to the High-Velocity Method of Washing (69912 D). Ills. 11000 w. A S C E, Pro—April, 1916. Continued discussion on paper by Ellms and Gettrust.

Construction of 160 Million Gallon Filter Plant at St. Louis (71107). John C. Pritchard. Ills. 3500 w. Crt—June, 1916. Details of construction.

Filtration Would Reduce Typhoid's Toll by 3000 Lives Annually (71142). George A. Johnson. 1200 w. E R—June 17, 1916. Value of pure water.

Improvements in the Art of Mechanical Filtration (70880 B). Thomas Fleming, Jr., with discussion and correspondence. Ills. 55 pp. E S W P—Jan., 1916.

A Study of the Behavior of Rapid Sand Filters Subjected to the High Velocity Method of Washing (69084 D). 1200 w. A S C E, Pro—March, 1916. Discussion of paper by Ellms and Gettrust.

Effect of Solutions of Filter Alum on Brass Pipe and Fittings (69059 N). G. R. Spalding. 1100 w. A W A, JI—March, 1916. Report of experiences.

Iron Removal by Rapid Sand Filtration (69062 N). Frank E. Hale. Also discussion. 19 pp. A W A, JI—March, 1916. Factors governing.

The Development of Rapid Sand Filters in Ohio (69065 N). Philip Burgess. 3000 w. A W A, JI—March, 1916.

Test Results Give Filter Loss-of-Head Data (68984). Langdon Pearse. Abstract of paper to Am. W. Wks. Assn. Ills. 1200 w. E R—March 18, 1916. At Oakland, Cal. Data on rise of sand in strainers and orifices.

Resanding Problems at Albany (69064 N). G. E. Willcomb. 7 pp. A W A, JI—March, 1916. Results obtained by washing.

Filter Operation (69061 N). S. M. Van Loan and Albert Tolson. 2000 w. A W A, JI—March, 1916. Philadelphia practice.

Cleaning the Bayside Filters (69060 N). E. G. Manahan. 2000 w. A W A, JI—March, 1916. Methods.

New Rapid Filtration Plant Near Killingwinning (71841 A). Ills. 1800 w. Enr—June 30, 1916. Interesting features.

Filtration

Fire Protection

The Principles of Filtration (72484). D. R. Sperry. Ills. 4500 w. M & C E—Aug. 15, 1916. Conditions, processes, fundamental law, etc.

A Small Mechanical Filter Plant, with Automatic Equipment Throughout (73158). E. E. Harper. Ills. 800 w. E & C—Sept. 13, 1916. Plant at Pleasanton, Kan.

Drifting-Sand Water Filters for Toronto, Ont. (73387). Ills. 2500 w. E N—Sept. 21, 1916. 72,000,000-gal. (Imp.) maximum capacity filters of Ransome type.

Toronto's Mechanical Filtration Plant (73313). Ills. 3500 w. Cn E—Sept. 14, 1916. Ransome drifting sand filter costing over one million dollars.

Experiences in Tuning Up St. Louis Filters Indicate What Will Not Work (74169). 2000 w. E R—Oct. 28, 1916. Lead pipe and brewery hose replace vitrified pipe with cement joints.

Filtered-Water Supply for Sacramento Recommended in 660-Page Report (73619). 2500 w. E R—Sept. 30, 1916. River water considered best and most economical. Novel head-house.

Pressure Filters (74127 N). Ills. 10500 w. A W W A, JI—Sept., 1916. Discussion of Harold C. Steven's paper.

See also same heading under **MECHANICAL ENGINEERING, Heating and Cooling.**

Fire Protection

See same heading under *Municipal.*

Flow

A Graphical Solution of the Problem of Storm Flow Through a Reservoir (69752). Albert S. Fry. Diagrams. 2000 w. E & C—April 19, 1916. Advantages of using inflow curves.

France

La Houille Blanche en France et en Allemagne (67016 B). Ernest Coustet. Ills. 2400 w. La Nt—Dec. 25, 1915. Resources of France and Germany in hydraulic power.

Le rôle de l'utilisation des chutes d'eau dans la reprise de l'activité industrielle et agricole (67737 C+D). Paul Levy-Salvador. Ills. 36 pp. S E I N Bul—Nov.-Dec., 1915. Necessity and methods of developing water powers of France.

Germany

See France.

Gravel Wells

Water from Gravel Wells (66524 N). C. W. Wiles. Also discussion. 1000 w. A W A—Dec., 1915. Best method of constructing such wells.

Great Lakes

The Water Supplies of Interstate Common Carriers on the Great Lakes (70568

WATER SUPPLY**Law**

N). H. P. Letton. Ills. 2500 w. A W W A, JI—June, 1916. Abstract of report by J. O. Cobb and C. L. Williams on operations of Sanitary District of Great Lakes during past season.

Hamilton

Reconstruction of Hamilton, Ontario, Water Works (65617 A). Andrew F. Macallum. Read before Am. Soc. of Munic. Imp. Ills. 2500 w. Munic Engng—Nov., 1915. Difficulties and methods of overcoming them.

Havana

El primitivo abastecimiento de agua a la ciudad de la Habana (71314 A). Luis Morales. Maps; ills. 7000 w. S C I Rv—June, 1916. Early water supply system of Havana.

Hibbing, Minn.

Water-Works Construction in Winter at Hibbing, Minn. (69551). R. E. McDonnell. Ills. 1100 w. E N—April 13, 1916. Work in extremely cold weather.

Hibbing Waterworks System (73228). (Ills. 1200 w. Mun JI—Sept. 14, 1916. Supply from wells in glacial drift.

Hydrants

Hydrant Design and Location (74124 N). E. P. Goodrich, with short discussion. 2500 w. A W W A, JI—Sept., 1916. Replies to questions, excerpts from letters, etc.

Ice Troubles

Sicherung des Turbinenbetriebes gegen Eisstörungen (67057 B). L. Koch. 3800 w. Z g T—Dec. 20, 1915. Protection of water-turbine plants against ice.

La question des glaces dans les installations hydrauliques (68800). J. Vichniak. 8 pp. R G S—Jan. 30, 1916. Discussion of formation of ice in hydraulic plants and its control.

Intakes

New Quincy Intake Characterized by Provision Against Accumulation of Sand (66916). Ills. 1500 w. E R—Jan. 1, 1916. Line laid in gravelly river bed.

Iron Removal

Further Development of Iron Removal Plant and Storage (70572 N). F. C. Amsbary. 1500 w. A W W A, JI—June, 1916. Successful method; trouble with larvæ and removal.

Kansas

Water Supplies of Kansas. Part I. Ground Water Supplies (67655 N). C. A. Haskins and C. C. Young. Ills. 187 pp. Univ Kan Bul—April 1, 1915. Plants, their construction, equipment and operation.

Law

Progress Report of the Special Committee on a National Water Law

Consult Classification of the Index. See page 7.

Leakage

(66729 D). 1800 w. A S C E—Dec., 1915.

Leakage

Leakage from Lead Joints in Cast-Iron Water Pipes (69493 D). Arthur H. Smith. Also discussion. 4500 w. N E W W A, JI—March, 1916. Quantity of water lost.

The Location of Leaks in Submarine Pipe Lines (67403 D). Elmer G. Hooper. 900 w. N E W W A, JI—Dec., 1915. Method in New York City on 12-in. crossing; Rikers to North Brothers Island.

Legislation

Water Power Laws and Their Relation to Industry and Progress (67095 A). F. Darlington. Ills. 5500 w. E M—Feb., 1916. Congress will be called upon to modify present laws.

Proposed Legislation Relative to California Ground-Waters (67206). Charles H. Lee. 4000 w. W E—Jan., 1916. Judicial decisions and suggestions.

Lime

Columbus Waterworks to Make Its Own Lime (66736). Charles P. Hoover. 1200 w. Mun JI—Dec. 23, 1915. By burning lime carbonate precipitated in softening plant, sufficient lime obtainable.

Los Angeles

Operating Cost Records Show Comparative Economy of 65 Motor Vehicles in Los Angeles Water Department (70796). Burt A. Heinly. Ills. 5000 w. E R—June 3, 1916. Analysis of data for machines employed.

Magnesia

Wird die aus den Kaliabwässern stammende Magnesia in den Flussläufen in nennswerten Masse ausgeschieden und ist damit zu rechnen, dass Chlor-magnesium aus den Flüssen in das Grundwasser eindringt? (69602 B). W. P. Dunbar. Ills. 4500 w. G-I—Mar. 11, 1916. Discussion of whether magnesium chloride is taken up from potash waste waters by the ground water.

Mains

Laying Water Pipes in Congested Streets, New York City (67401 D). M. Blatt. Ills. Also short discussion. 2500 w. N E W W A, JI—Dec., 1915. Conditions and difficulties.

Laying Submerged Water Mains at Vancouver, B. C. (66831). Ills. 1500 w. E N—Dec. 30, 1915. Flexible joint pipes, 18-in. diameter, laid in 75-ft. of water and rapid current.

Making and Laying Home-Made Pipe for Water Mains (68185). Ills. 1500 w. E N—Feb. 17, 1916. Cement-lined wrought-iron mains in Plymouth, Mass.

WATER SUPPLY**Meters**

Recommends Steel Pipe for 37-Inch Water Main $9\frac{3}{4}$ Miles Long at Rochester 771670). 2500 w. E R—July 8, 1916. Edwin A. Fisher favors lock-bar line.

Data and Discussion on Cast Iron Pipe Joint Tests for the San Francisco High Pressure Fire System (71780). Aug. J. Bowie, Jr. Ills. 3500 w. E & C—July 12, 1916. Methods by which leakage has been minimized.

Manchester

Modernizing the Manchester Water Works (69372). Ills. 2000 w. E N—April 6, 1916. Building larger pumping plant.

Manganese

Manganese in Ground Water and Its Removal (67760 N). S. B. Applebaum. 3500 w. JI I E C—Feb., 1916. Summary of European experience.

Manila

Notes on the Water Supply of the City of Manila (73196 N). George W. Heise. 2000 w. P JI S—Jan., 1916. Factors influencing the quality, with special reference to the disinfection.

Massachusetts

Water-Supplies and Health in Massachusetts (66143). 2100 w. E N—Dec. 2, 1915. Hardness, color; typhoid and general death rates.

Medicine Hat

Water Supply and Power at Medicine Hat (65313). Ills. 2000 w. Can Engr—Oct. 28, 1915. Municipal development comprising water supply and filtration and gas-generated electric power in one plant.

Melbourne

The Water Supply of Melbourne (69884 A). Map & Ills. 3000 w. Enr—April 7, 1916. Serial, 1st part. Record of progressive improvements.

Meter Rates

Report of Committee on Meter Rates (73366 D). With discussion. 50 pp. N E W W A, JI—Sept., 1916.

Meters

Meter Maintenance and Repair Systematized in East Orange, N. J., Water Department (70798). 1500 w. E R—June 3, 1916. Methods employed.

Testing Meters with Reference to Curves of Accuracy and Friction Loss (67404 D). Fred B. Nelson. 1500 w. N E W W A, JI—Dec., 1915. Features which need improving.

Experience with Full Meterage of Water Supply at Miles City, Mont. (69346). G. C. Pruett. 1500 w. E & C—April 5, 1916. Favorable.

Mississippi Valley**WATER SUPPLY****Pumping****Mississippi Valley**

Surface Water Supply of the United States, 1914. Part V. Hudson Bay and Upper Mississippi River Basins (68502 N). Nathan C. Grover, W. G. Hoyt and A. H. Horton. 240 pp. U S G S—Water Sup. Paper 385.

Montreal

Montreal Waterworks Situation (65705). Ills. 4000 w. Can Engr—Nov. 11, 1915. Outlines original scheme and extensions and power development under discussion.

Naugatuck River

Storage Reservoir Feeders Planned to Abate Naugatuck River Nuisance (69934). Charles H. Preston, Jr. Ills. 1800 w. E R—April 29, 1916. Project for water conservation in Connecticut.

New Mexico

Geology and Underground Water of Luna County, New Mexico (70408 N). N. H. Darton. Ills. 170 pp. U S G S—Bul 618. Results of examination.

Niagara Falls

See same heading under **INDUSTRIAL MANAGEMENT, Miscellany.**

Ohio Basin

Surface Water Supply of the United States, 1914. Ohio River Basin (70564 N). Nathan C. Grover, Albert H. Horton, and Warren E. Hall. Ills. 115 pp. U S G S—Water-Supply paper 383. Data.

Ohio Valley

Water Supply Problems Along the Ohio River (68581 A). Webster Frank. Ills. 2000 w. Mun E—March, 1916. Successes and failures.

Oregon

The Oregon Water Code and Benefits Through State Administration of Streams (73096). John H. Lewis. 2200 w. W E—Sept., 1916. Address at Water-Code Conference, Tacoma. Advantages of the system, based on seven years operation in Oregon.

Oxygen Consumption

The Oxygen-Consuming Power of Natural Waters (73198 N). George W. Heise and R. H. Aguilar. 2500 w. P J I S—Jan., 1916. A study with conclusions.

Panama

Early Municipal Water Works at Panama (65832 B). Carleton E. Davis. (Abstract.) 2000 w. Fr Inst, Jour—Nov., 1915. Phases of the construction of the American work.

Philippines

The Location of Artesian Wells in the Philippine Islands from a Geologic Viewpoint (65835 N). Wallace E. Pratt. 2500 w. Philippine Jour of Sci—July, 1915.

The relation of geologic formations to artesian supply.

Pipe Bends

Lost-Head Diagram for Bends in Water Pipe (68186). Ben Moreell. Diagrams. 1800 w. E N—Feb. 17, 1916.

Pipe Joints

I. Leadite Joints for Water Pipes. Henry A. Symonds. II. Leadite for Joints in Cast-Iron Water Pipes. W. C. Hawley (67407 D). Two papers discussed together. 7500 w. N E W W A, JI—Dec., 1915. Testimony concerning the use.

Angles, Elbows and Lay-Out Construction by New Method (67607). William J. Smith. Ills. 1200 w. M & E W—Jan. 29 1916. Curve sheet diagram and its use.

Pipe Lines

The Coolgardie and Kalgoorlie Pipe Line (73020 A). 2500 w. Enr—Aug. 15, 1916. Scheme for supplying the Australian gold fields with water. Present condition of mains 351½ miles long.

The Nevada Wonder Pipe-Line (70245 A). J. A. Burgess. Ills. 2500 w. W E—May, 1916. Automatic devices for checking interruptions.

Pipes

Why American Water Pipes Are Best (72648 A). Percy G. Donald. Ills. 2000 w. I A—Aug. 24, 1916. British, Canadian, and American products compared. Packing methods, threads, manufacturing methods, and costs.

Results of Questionnaire on Life and Depreciation of Cast Iron Water Pipe in 14 Large American Cities (66501). 2000 w. E & C—Dec. 15, 1915.

Power Estimates

Power Estimates from Stream Flow and Rainfall Data (68753 B). Dana M. Wood. 40 pp. B S C E, JI—March, 1916. Methods.

Precipitation

Variations in Precipitation as Affecting Waterworks Engineering (69058 N). Ills. 103 pp. A W A, JI—March, 1916. Thorough discussion.

Plumbing

Plumbing Code and Control of Plumbers (66536 N). Scotland G. Highland. Ills. Also discussion. 9000 w. A W A—Dec., 1915. Responsibility of waterworks officials.

Pumping

The Use of Oil Engines for Pumping (70567 N). C. R. Knowles. 2000 w. A W W A, JI—June, 1916. Report of tests with various fuels.

Pneumatic Pumping as Applied to Municipal Plants (69066 N). John Oliphant.

Consult Classification of the Index. See page 7.

Pumping Stations

Ills. 2000 w. A W A, JI—March, 1916. Types of air lift.

Die elektro-automatischen Thetis-Pumpwerke der Stadt Mülhausen (68803 B). A Schmidt. Ills. 1500 w. E K u B—Feb. 14, 1916. Description of electric automatic pumping station for the city of Mülhausen.

Buffalo Completes Huge New Pumping Station (67815). Ills. 1200 w. E N—Feb. 3, 1916. Details of Francis G. Ward station.

Emergency Pumping with 412-Ft. Single-Stage Centrifugals (71263). Ills. 1000 w. E N—June 22, 1916. Installed by City of Lynchburg, Va.

Pumping Costs with Diesel Engines Given in Detail (70797). H. W. Gochbauer. Ills. 1600 w. E R—June 3, 1916. Installation in duplicate at Appleton, Wis.

Turbine Pumping Station Below Ground in San Antonio (71090). Ills. 1500 w. E N—June 15, 1916. Artesian-well supply.

The Electric Pumping of Deep Wells at Memphis, Tenn. (69472). 800 w. E & C—April 12, 1916. System patented by Wirt J. Wills was successful.

The Pumping Problem in Morningside Park (69730). Frank Richards. Ills. 2000 w. C A M—April, 1916. Mechanical feature.

Pumping Stations

Lake View Pumping Station (73802). Thomas Wilson. Ills. 3500 w. Pwr—Oct. 10, 1916. 100,000,000-gal. station with provisions against shutdown.

Pumping Machinery, Test Duty versus Operating Results (74126 N). 2800 w. A W W A, JI—Sept., 1916. Discussion of J. N. Chester's paper.

Pump Testing

Proper Methods of Testing Water-Works Pumps (71504). L. A. Day. 3500 w. E N—June 29, 1916. Argument for use of A S M E testing code.

Purification

Colloidal Theories, Applied to Colored Water, Reduce Cost of Chemicals (70799). George F. Catlett. Ills. 3500 w. E R—June 3, 1916. Saving of 50 to 70 per cent effected in city of Wilmington, N. C.

Considerations in Determining the Point of Application of Liquid Chlorine in the Disinfection of Water Supplies (70767). Francis F. Longley. 2800 w. E & C—May 31, 1916. Reviews conditions that determine the point of application.

Present Status of Disinfection of Water Supplies (66528 N). Francis F. Loug-

WATER SUPPLY

ley. Also discussion. 4500 w. A W A—Dec., 1915. From replies to general inquiry.

The Design and Operation of Intermittently Operated Water Purification Plants (66535 N). N. T. Veatch. 1000 w. A W A—Dec., 1915. Particularly when retention period is 4 to 6 hours.

Treatment of Water with Hypochlorite (66554 A). Joseph Race. Read before Soc. of Chem. Ind. (Montreal.) 3000 w. S M C E—Dec. 3, 1915. Effect of temperature; benefits, etc.

Ultra-Violet Ray Sterilization of Water (66625). Ills. 4000 w. Cn E—Dec., 1915. Extracts from report of Ontario Board of Health.

The Use of Ammonia in the Chlorination of Water (68967). Joseph Race. 1500 w. Cn E—March 16, 1916. Experiments on relative efficiencies.

Special Features of Four New Water Purification Plants in Indiana (68897). John C. Diggs. Read before Ind. San. and Water Sup. Assn. 2000 w. E & C—March 29, 1916. Logansport, Princeton, Paoli and Wolcott.

Some Aspects of Chlorination (70578 N). Joseph Race. 2000 w. A W W A, JI—June, 1916. Details of the process as used.

Copper Sulphate Treatment of St. Paul, Minnesota, Water Supply (70587 N). N. L. Huff, with introduction by Garrett O. House. Ills. 41 pp. A W W A, JI—June, 1916. Report of microscopical study upon effects.

Operation Results of the Water Purification and Softening Plant of Fargo, N. D. (69754). Frank La F. Anders. From paper before N D Soc of Engrs. 1500 w. E & C—April 19, 1916. Iron and lime process used.

The Wakefield Water Sterilization Plant (69503 D). Edward C. Sherman. Ills. Also discussion. 2000 w. N E W A, JI—March, 1916. Chlorine plant.

Constant-Level Orifice Box Feeding Chemicals (69693). Weston Gavett. Ills. 1000 w. E N—April 27, 1916. Details of device.

The Design and Operation of Ozone Water Purification Systems (71688 N). Sheppard T. Powell. Ills. 3000 w. JI I & E C—July, 1916. Brief review of the production and properties of ozone, describing types of ozonizers.

The Removal of Iron from Municipal Water Supplies (71864 N). James W. Schwab. Ills. 40 pp. U K, Bul—April 15, 1916. Chemistry; history; iron in Kansas; Lawrence experiments, and conclusions.

Consult Classification of the Index. See page 7.

Rainfall

Water Supply for Troops in the Field (71779). Jack J. Hinman, Jr. 3000 w. E & C—July 12, 1916. Methods of field analysis, sterilization, purification, etc.

Preliminary Report Upon Purification of Swimming Pools of the State University of Iowa (72414). Jack J. Hinman, Jr. Ills. 1200 w. E & C—Aug. 9, 1916. Plants for purifying two gymnasium pools. Also for class use in hydraulics and water supply.

Recent Advances in the Improvement of Water Supplies (72631 N). C.-E. A. Winslow. 4500 w. Conn Soc Civ Engrs—1916. Methods of purification and disinfection.

Cost and Use of Chemicals at Purification Plant of St. Louis, Mo. (73850). 1200 w. E & C—Oct. 11, 1916. Data from recent report of Edward E. Wall.

Rainfall

Over regenval in Nederlandsch-Indië (71336 B). J. C. H. Fischer. Charts. 5000 w. Ing—May 13, 1916. Fifty years' rainfall statistics in the Dutch Indies.

Records

Plans and Records of Water Distribution Systems (71837 A). William P. Walker, with discussion. Read before Inst. of Water Engrs., London. Ills. 4000 w. S M C E—June 30, 1916. Recent improvements in methods.

Plans and Records of Water Distribution Systems (72436). William P. Walker. Ills. 1200 w. Cn E—Aug. 10, 1916. Mains record register; valve location book, etc.

Red Water

Red Water and Suggested Remedies (71189 B). Nicholas S. Hill, Jr. 7000 w. S I—April, 1916. Occurrence, causes and effect, remedies, etc.

Reforestation

Costs and Results Obtained in Reforestation of the Croton Watershed (69498 D). T. C. Culyer, with discussion. Ills. 5500 w. N E W W A, JI—March, 1916.

Detail Methods Used in the Forestation of Watersheds (69497 D). Sidney K. Clapp. 1500 w. N E W W A, JI—March, 1916. Troubles, results of experience, and costs.

Regis, Germany

Das Wasserwerk des Gemeindeverbandes für Wasserversorgung von Regis und Umgebung (66249 B). Salbach. Ills. 3600 w. E K u B—Nov. 24, 1915. General description of water-supply system for group of towns.

Regulations

See Water under INDUSTRIAL MANAGEMENT, *Regulation*.

WATER SUPPLY**Reservoirs****Reservoir Control**

Lake of the Woods Levels and Outflow (71651). Arthur V. White and Adolph F. Meyer. Ills. 5500 w. Cn E—July 6, 1916. Serial, 1st part. Review of consulting engineers report on investigations made.

Reservoirs

Construction of Hill View Reservoir (71703). Ills. 2500 w. Cnt—July, 1916. Steam shovel excavation; concrete lining, etc.

Water-Power Storage Reservoir with Pumping Station (71785). Ills. 1800 w. E N—July 13, 1916. Plant at Bear Lake, Utah.

Notched Steel Brackets Aid Placing of Hoop Reinforcement for Concrete Reservoir (73076). E. W. Kelly. Ills. 3500 w. E R—Sept. 9, 1916. Duluth's 5,000,000-gallon circular basin concreted during freezing weather.

Sealing Seattle's Reservoirs (72918). Ills. 2500 w. Mun JI—Aug. 31, 1916. Recommendations for making water tight a reservoir in porous gravel.

Every Possible Precaution Observed to Make Watertight Keechelus Reservoir, Washington (73924). C. E. Crownover. Ills. 2500 w. E R—Oct. 14, 1916. Features of design of dam in Yakima valley.

Puddling and Rolling to Assure Impervious Foundation for Keechelus Reservoir (74170). C. E. Crownover. Ills. 2500 w. E R—Oct. 28, 1916. Careful construction of embankment.

Reservoirs (74128 N). 4500 w. A W W A, JI—Sept., 1916. Discussion of Dabney H. Maury's paper.

Circular Covered Service-Reservoirs (69808 N). William Morris. Ills. 2500 w. I C E, No. 4121—1915. Built in Kent.

Water Works Reservoirs (70588 N). Dabney H. Maury. Ills. 30 pp. A W W A, JI—June, 1916. Classes, uses and limitations, location, design difficulties and suggestions.

Huge Circular Reservoir in Dubuque Protects Congested-Value Business District (70211). Dabney H. Maury. Ills. 4000 w. E R—May 6, 1916. Design of 750,000-gallon reservoir.

Serbatoio a costante carico di efflusso (67012 B). C. Fossa-Mancini. Ills. 8 pp. S I A I An—Dec. 16, 1915. Serial, 1st Part. Device for maintaining constant head on outflow from reservoirs.

Reservoir Improvements at Castleton (67588). Ills. 1200 w. Mun JI—Jan. 27, 1916. Details; itemized cost by day labor.

Lining Hill View Reservoir with Concrete and Riprap (70763). Arthur W. Tidd. Ills. 3700 w. E N—June 1, 1916.

Consult Classification of the Index. See page 7.

Review of 1915

WATER SUPPLY

Softening

Details of methods used on Catskill Aqueduct reservoir near N. Y. City.

The Waldeck Reservoir in Germany (71190 A). Kenneth C. Grant. Ills. 5500 w. E S P, JI—May, 1916. Largest artificial reservoir in Europe.

Reconstruction of a Reservoir at St. Louis, Missouri (66739). Ills. 2600 w. E N—Dec. 23, 1915. Watertight lining and raised wall.

Making Concrete Tight; Tacoma and Seattle Water-Works (66142). C. E. Fowler. Ills. 1100 w. E N—Dec. 2, 1915. Repairing leaks.

See also Excavation under CIVIL ENGINEERING, *Construction*.

See also Grubbing under *Construction*.

Review of 1915

Water Supply in 1915 (67528 A). 3500 w. Enr—Jan. 7, 1916. Work in Great Britain principally.

Riparian Rights

Riparian Rights Settled by Arbitration After Suit (73079). Frank P. McKibben. 1200 w. E R—Sept. 9, 1916. Engineering Board determines damages sustained by small mill owner in Pennsylvania.

Run-Off

Scoli perenni a deflusso temporaneo (67778 C). Giacinto Turazza. Ills. 5 pp. S I A I An—Jan. 10, 1916. Mathematical analysis of relation of protracted run-off to temporary precipitation.

Russia

Water Power in Russia (67518 A). P. Gurewitch. Map. 4000 w. Eln—Jan. 7, 1916. Water power resources and their present development.

St. John, N. B.

Water Supply of the city of St. John, N. B. (69363). R. Fraser Armstrong. Ills. 1800 w. Cn E—April 6, 1916. Review of development.

St. John's Nfd.

Improvements to the Water Supply at St. John's, Newfoundland (70575 N). F. F. Longley. Ills. 1800 w. A W W A, JI—June, 1916. Correcting deficient quantity and pressure, and detecting waste.

Salem, Mass.

The Water Supply of Salem and Beverly (69495 D). Francis F. Longley, with discussion. Ills. 3500 w. N E W W A, JI—March, 1916. History; scheme for securing additional supply.

The Water Supply of Salem, Mass. (67442 B). William S. Johnson. Ills. 6000 w. B S C E, JI—Jan., 1916. History since 1797, recent works. Also discussion.

San Francisco

Water Supply of the San Francisco-Oakland Metropolitan District (66019 D).

4500 w. Am Soc Civ Engrs, Pro—Nov., 1915. Continued discussion of H. T. Cory's paper.

Water Supply of the San Francisco-Oakland Metropolitan District (67598 D). 10000 w. A S C E, Pro—Jan., 1916. Continued discussion of H. T. Cory's paper.

Work on Hetch Hetchy Water Project Begins (66918). Ills. 1200 w. E R—Jan. 1, 1916. Preliminary construction.

Sanitation

The Element of Chance in Sanitation (72370 B). George C. Whipple. Ills. 4500 w. F I, JI—Aug., 1916. Application of the laws of probability.

Water Supply Sanitation in the Nineteenth Century and in the Twentieth (72371 D). William T. Sedgwick. 4500 w. N E W W A, JI—June, 1916. Reviews the history of its development.

Some Considerations in Estimating the Sanitary Quality of Water Supplies (66532 N). W. H. Frost. Also discussion. 7500 w. A W A—Dec., 1915. Mainly discussion of cause of typhoid.

Schenectady, N. Y.

Improving Schenectady's Water-Works (69699). Ills. 1200 w. Mun JI—April 27, 1916. Serial, 1st part. Detailed description.

Seattle

Seattle Water-Works Troubles (69207). Charles Evan Fowler. Ills. 2200 w. E N—March 30, 1916. Wood-stave pipe lines not properly maintained. Need for more storage and high-pressure fire protection.

Siphons

Review of Records of Concrete Casing and Lining Steel and Wood Stave Pipe Siphons (70042). Ills. 3500 w. E & C—May 3, 1916. Concreting features.

Steel and Iron Siphons of the Catskill Aqueduct (71202 A). J. F. Springer. Maps & Ills. 3500 w. C E M—June, 1915. Constructional features.

Laying the Shore End of the Narrows Siphon, New York (71702). Ills. 2500 w. Cnt—July, 1916. Special steel sheeting for deep submerged trench. Difficult work.

Softening

Water Softening by Filtration Through Artificial Zeolite (70576 N). Daniel D. Jackson, with discussion. Ills. 2500 w. A W W A, JI—June, 1916. Details of new process.

Successful Water Softening and What It Costs the Village of Hinsdale (70573 N). C. B. Williams. 900 w. A W W A, JI—June, 1916. Conditions at Hinsdale, Ill.

The Bubbly Creek Water Softening Plant (70569 N). C. A. Jennings. 700

South Bend, Ind.**WATER SUPPLY****Valves**

w. A W W A, JI—June, 1916. Plant at Chicago Union Stock Yards.

Softening Plant Converts Hard, Impure River Water Into Boiler Feed Supply (65870). Ills. 2500 w. Eng Rec—Nov. 20, 1915. Installation at Youngstown, O., tube mill. Chemical treatment by intermittent system and rapid filtration.

Water Softening Practice (69063 N). Samuel A. Greeley. 20 pp. A W A, JI—March, 1916. Review.

Experiments in Water Softening with a Zeolite-like Substance (69070 N). Robert N. Kinnaird. 800 w. A W A, JI—March, 1916. Information on process.

South Bend, Ind.

Procedure in Maintenance and Operation of Water Works at South Bend, Indiana (67136). Ills. 6000 w. E & C—Jan. 5, 1916. Artesian supply—100 wells.

Spillway Gates

Swiss Automatic Gates Will Guard Wisconsin Dam (67078). 1000 w. E R—Jan. 29, 1916. Tip only enough to pass excess water.

Standpipes

Grouting or Cushioning Standpipe Bases (69502 D). Charles W. Sherman. 1000 w. N E W W A, JI—March, 1916. Suggested by recent experience in grouting at Needham, Mass.

Stream Pollution

Interstate and International Aspects of Stream Pollution (71925 B). Earle B. Phelps. 1300 w. M E—1916. Work of International Joint Commission.

The Legal Phase of Stream and Lake Pollution (71928 B). E. D. Rich. 3000 w. M E—1916. Legislation for objectionable conditions.

The Use and Abuse of Streams in Sewage Disposal (71924 B). W. C. Hoad. 3500 w. M E—1916. Regulation and control of streams.

Surface Supply

Surface Water Supply of Snake River Basin, 1913 (72649 N). Nathan C. Grover, G. C. Baldwin and F. F. Henshaw. 280 pp. U S G S—362-B. One of a series of 12 reports giving results of measurements of flow made on streams in the United States during 1913.

Tanks

The Middleboro, Mass., Reinforced Concrete Water Tower Tank (72373 D). George A. Sampson. Ills. 9 pp. N E W W A, JI—June, 1916. Conditions that led to the construction, with description.

Tank Construction (68085 A). Ernest G. Beck. Ills. 2000 w. Mch W—Jan. 28, 1916. Serial, 1st part. Principles.

Inclosing 2,500,000-Gal. Steel Water Tank with Masonry (67457). Ills. 700 w. E N—Jan. 20, 1916. Work recently completed at Metropolitan Water Works, Boston.

Old and New Water Tanks at Princeton, N. J. (67582). R. W. Becker. Ills. 1500 w. E N—Jan. 27, 1916. Striking changes in design.

Taps

How to Determine the Size of Tap and Meter (66533 N). Jacob Klein. 700 w. A W A—Dec., 1915. Basis for determining size.

Texas

Ground Water in La Salle and McMullen Counties, Texas (68275 N). Alexander Deussen and R. B. Dole. Maps. 37 pp. U S G S, Water Sup. paper 375-G—Feb. 17, 1916.

Throttling Gates

Throttling Gates Save 300,000 Gal. of Water Daily (67865). Caleb M. Saville. 1200 w. E R—Feb. 5, 1916. Method to conserve supply.

Tropics

Tropical Water Supplies, with Special Reference to the Canal Zone and to Vera Cruz, Mexico (70581 N). James T. B. Bowles. Ills. 3000 w. A W W A, JI—June, 1916. Outlines development.

Tunneling

Tunnelling for a Water Supply (66966 N). F. E. Rosman. Ills. 800 w. Cw E—Dec., 1915. The Millbrook scheme, S. Aust.

Tunnels

Construction of Wilson Avenue Intake Tunnel (70782). F. H. Bernhard. Ills. 3000 w. Mun JI—June 1, 1916. Serial. 1st part. Novel methods at Chicago. Day labor.

Typhoid

The Typhoid Toll (70565 N). George A. Johnson. 78 pp. A W W A, JI—June, 1916. Statistics, causes, prevention.

Underground Water

Mededeelingen omtrent de uitkomsten van door het Rijksbureau voor Drinkwater voorziening ingestelde geo-hydrologische onderzoekingen in verschillende duingebieden (72113). J. Van Oldenborgh. Charts. 4000 w. Serial, 1st part. Ing—June 17, 1916. Results of various geo-hydraulic bore hole tests as determined by the Imperial Commission on water supply.

Valves

I. Reasons for Adopting the Solid Wedge Type of Valve in the Boston Water Department. George H. Finneran. II. Reasons for Using the Double-Disk Type of Valve. J. M. Diven (69500 D). Ills.

Consult Classification of the Index. See page 7.

Venturi Meter

23 pp. N E W W A, JI—March, 1916. Two papers discussed together.

Electrically Operated Valve Installations and Their Control from a Distance (67400 D). Alfred Williamson. 1000 w. N. E W W A, JI—Dec., 1915. Details of gates for high-pressure system in Manhattan.

Venturi Meter

See Flow under *Measurement*.

Victoria

Sooke Lake Water Supply, Victoria, B. C. (65880). C. H. Rust. Ills. 2000 w. Can Engr—Nov. 18, 1915. Details of an extensive undertaking.

Ten and Three-Quarters Miles of 36-Inch Riveted-Steel Pressure Line Built on Sooke Work (65564). Boyd Ehle. Ills. 1200 w. Eng Rec—Nov. 6, 1915. Pipe line of Victoria, B. C.

Waste

Approximate Original Methods and Subsequent Special Device for Measuring Water Waste at St. Johns, Newfoundland (71215). Extract from paper by F. F. Longley. Ills. 800 w. E & C—June 21, 1916.

The Prevention of Water Waste on Railroads (70580 N). C. R. Knowles. Ills. 1200 w. A W W A, JI—June, 1916.

Waterbury, Conn.

The Construction of the Morris Dam Addition to the Waterbury Water Supply (72635 N). C. L. Nord. Ills. 4500 w. Conn Soc Civ Engrs—1916. Details of the work.

Water Powers

See Power Development under **ELECTRICAL ENGINEERING, Generating Stations.**

Water Pressure

Water-Pressure Regulating Apparatus (70445 A). Ills. 800 w. Eng—April 28, 1916. Details.

Water Rights

Compensation in Kind Involved in Hartford Water Case (72417). Caleb Mills Saville. 2400 w. E N—Aug. 10, 1916. Private property can be condemned.

Watersheds

Sanitary Improvement of a Large Watershed (67399 D). George G. Honness. Map. 1200 w. N E W W A, JI—Dec., 1915. Catskill drainage area.

Erosion of Watersheds and Its Prevention (70574 N). Benjamin Brooks. 2000 w. A W W A, JI—June, 1916. Problem of soil saving.

Water Testing

Note sur une methode rapide d'appréciation de la qualite des eaux (72110). MM. Gilbert et Doublement. 1000 w. P C An—November, December, 1915. A rapid

WATER SUPPLY**Wells**

method for determining the quality of water.

Water Works

Seattle Water Works Improvements (71942). Ills. 2200 w. Mun JI—July 20, 1916. Increasing storage—relative reliability of wood-stone and steel pipe.

Municipal Water-Works Financing in Massachusetts as Affected by Recent Legislation (72375 D). Charles W. Sherman, William S. Johnson, and Henry A. Symonds. 3500 w. N E W W A, JI—June, 1916. How present laws affect conditions and the remedy.

Revenue and Operating Expense of Municipally Owned Water-Works in Massachusetts for the Year 1913 (72374 D). Charles W. Sherman, with discussion. 18 pp. N E W W A, JI—June, 1916. Statistics.

Some Water-Works Experiences in Hartford, Conn. (72372 D). Caleb Mills Saville, with discussion. 56 pp. N E W W A, JI—June, 1916. Causes of losses, pollution and inadequate supply.

Some Suggestions Pertaining to the Operation of Water Works Plants (68148). John W. Toyne. Read before Ind. San. & Water Sup. Assn. 1300 w. E & C—Feb. 16, 1916. Question of management.

Automatic Water-Works for a Small Town (71086). Clyde Potts. Ills. 1200 w. E N—June 15, 1916. Milltown, N. J.

Increasing Water Works Efficiency Under City Manager Government (70453). 1200 w. E & C—May 17, 1916. Experiences in various cities.

A Discussion of 14 Important Features of Water Works Operation—Montana Regulations Governing Water Service (67228). 4000 w. E & C—Jan. 12, 1916. Essential features of discussion and rules and regulations.

Two Small Waterworks (66520 N). W. L'Estrange Duffin. Ills. 2500 w. I C E I—Dec. 1, 1915. Special features of Passage East, and of Tramore waterworks.

Difficulties in the Designing and Operation of Medium Sized Water Works Plants (70577 N). E. B. Black. 1700 w. A W W A, JI—June, 1916. Some reasons for defects.

Wells

Driving a Well to the Trinity Sands at Dallas, Texas (71056). Ernest L. Meyers. Ills. 2000 w. E & C—June 14, 1916. Feature of interest, method of sealing by cementation.

Pumping from Deep Wells Into Water Mains at Memphis (70765). Ills. 2100 w. E N—June 1, 1916. Artesian well system.

Consult Classification of the Index. See page 7.

Winnipeg

WATERWAYS AND HARBORS

Canals

Water for Joliet (70660). Ills. 2000 w. P E, C—June 1, 1916. Air lift raises water from 1600-ft. wells.

Deep Bore-Wells for Public Water Supply Purposes (70533 A). W. H. Maxwell. Ills. 3000 w. Enr—May 5, 1916. Features of work at Tunbridge Wells Corporation.

Driven Well Supply of Muscatine, Iowa (70571 N). William Molis. 500 w. A W W A JI—June, 1916. Brief account of excellent supply.

Artesian Wells and Methods of Pumping Them (66526 N). John D. Kilpatrick. Also discussion. 6000 w. A W A—Dec., 1915. Drilling, construction, pumping.

See same heading, under *Irrigation and Reclamation*.

Winnipeg

A Short Description of Some of the Construction Features of the Greater Winnipeg Water Supply (67998 B).

James H. Fuertes. Ills. 7000 w. W S E, JI—Nov., 1915. Details.

Winter Operation

Winter Operation of Water Works at Miles City, Montana (70220 A). G. C. Pruett. 1800 w. Mun E—May, 1916. Troubles in cold climate.

Wood Pipes

Experience with Wood Pipes in New Hampshire (73364 D). Arthur W. Dudley. Ills. 2000 w. N E W W A, JI—Sept., 1916. Statement of advantages.

Wood-Stave Pipe

Why the Seattle Wood-Stave Pipe Failed (67822). R. H. Ober. Ills. 1200 w. E N—Feb. 3, 1916.

The Use of Concrete for Protecting Wood-Stave Pipe (67208). Kenneth A. Heron. Ills. 1500 w. W E—Jan., 1916. Repairs made in Colorado.

Redwood Stave Pipe for Mining and Power Use (67608). H. B. Worden. Ills. 1000 w. M & E W—Jan. 29, 1916. Advantages.

WATERWAYS AND HARBORS

Air Breakwater

The Brasher Air Breakwater (70856 A). Ills. 1700 w. Enr—May 19, 1916. Describes installation at El Segundo, Calif., and its success.

Alaskan Ports

Planning of Alaskan Ports (69556 N). Paul Whitham. Ills. 30 pp. Dept of Int—1916. Suggested procedure.

Astoria

Municipal Docks at Astoria (73862). J. P. Newell. Ills. 2400 w. E N—Oct. 12, 1916. Piers just completed at northern Pacific port. Timber and earth-fill wharf.

Barge Canal

How the New York Barge Canal Will Be Operated (67455). William H. Yates. Ills. 4800 w. E N—Jan. 20, 1916. Serial, 1st Part. Capacity and service. Gate machines, valve machines, capstans and concrete lock cabins.

Electricity on the New York State Barge Canal (66973 A). E. W. Pilgrim. Ills. 3000 w. G E R—Jan., 1916. In construction and operation.

Rebuilding Barge Canal at the Irondequoit Break (69374). Emile Low. Ills. 1000 w. E N—April 6, 1916. Repair of washout near Rochester.

New York Barge Canal Is in Partial Operation (74164). Ills. 4500 w. E R—Oct. 28, 1916. Construction 90 per cent. finished. 180 miles in operation.

Barges

Canal and River Barges (73735 A). 2500 w. Enr—Sept. 22, 1916. Results of different investigators.

Bayonne

Les Ports Français Et La Guerre (74221 B). A. Pawlowski. Illus. 4100 w. Gn Cv—Sept. 16, 1916. Description of this French seaport and its trade.

Belfast

Belfast Harbour (74226). 1800 w. T E S—Sept. 29, 1916. Description of improvements, contemplated and those recently finished.

Black Sea Ports

La Mer Noire et ses ports (66218 B). La Nt—Nov. 20, 1915. Ills. 2500 w. Brief history and description of Black Sea ports.

Breakwater

Breakwater at Sandy Bay, Cape Ann, Massachusetts (73373 B). William E. Craighill. Ills. 20 pp. P M—Sept.-Oct., 1916. Project for constructing a harbor of refuge.

Buffalo

Buffalo Barge Canal Terminal (66355). Ills. 1000 w. E N—Dec. 9, 1915. Deepening of Erie Basin, and construction of piers.

Canals

Der Mittelland-Kanal (67709 B). O. Franzius. Ills. 12 pp. T u W—Jan.,

Consult Classification of the Index. See page 7.

Canals

WATERWAYS AND HARBORS

Docks

1916. Critical discussion of importance of German Mittelland canal project.

Portable Concrete Plant Builds Louisville and Portland Canal Wall (69551). Ills. 2000 w. E R—April 15, 1916. Widening.

The New Rhone-Marseilles Canal (69875 A). Ills. 3500 w. Eng—April 7, 1916. Work in France nearing completion.

Le canal de Marseille au Rhone (71325 B). A. Dumas. Ills. Serial, 1st part. 6000 w. Gn Cr—May 20, 1916. General description of the Marseilles-Rhone canal and Rove tunnel.

Surges in an Open Canal (70634 D). R. D. Johnson. 700 w. A S C E, Pro—May, 1916. A rational theory on which to base research.

Economic and Strategic Aspects of Enlargement of Welland Canal and of Construction of Georgian Bay Ship Canal (72361 N). R. W. Leonard. 12 pp. C S C E—Feb. 17, 1916. Discussion.

Completion of Lake Washington Canal (72927 A). Gilbert C. Dohm. Ills. 1200 w. I Mr E—Sept., 1916. Improvement of Seattle's shipping and shipbuilding industries.

Enkele mededeelingen omtrent hat Wilhelminakanaal (73540 B). Peursum and Harmsen. Ills. 8700 w. Ing—Sept. 2, 1916. Description of a new canal crossing Holland from east to west and lately put in use.

Le Rhône Navigable Et Le Tunnel Du Rove (73508 B). E. Coustet. Ills. 4100 w. La Nt—Aug. 19, 1916. Description of this important work which connects the river Rhone with the sea.

Power Equipment for the Barge Canal System of the State of New York (73157). C. H. MacCulloch. Ills. 4000 w. E & C—Sept. 13, 1916. Details of the electric power system for operating the locks.

The Punjab Triple Canal System (73150 N). John Benton, with abstract of discussion. Maps and Illus. 50 pp. I C E, Paper No. 4137—1916. Design and construction of three large separate and interconnected irrigation canals in an important district of India.

Channel Tunnel

The Channel Tunnel (73700 A). Ills. 7000 w. E Rv—Sept., 1916. Arguments for the tunnel, with critical summary of the engineering and military aspects.

China

Waterbouwkunde in China (66234 B). F. J. Blom. Ills. 7000 w. Ing—Dec. 4, 1914. River improvement and canal work in China.

Coal Shipping from China and Japan (69107). F. J. Warden-Stevens. Ills.

2000 w. Cl A—March 25, 1916. Large ports and their equipment.

Coal Docks

Coal Dock for the Southern at Charleston, S. C. (67269). Ills. 1500 w. R A G—Jan. 14, 1916. Plan and construction.

Coal Pier

New Coal Pier of the B. & O. R. R., at Curtis Bay, Baltimore (73240). Ills. 1000 w. R R—Sept. 16, 1916. Operated by belt conveyors from car dumping machines.

Cofferdam

The Cofferdam at Lock No. 2, Cape Fear River, North Carolina (73874 B). Norman M. Chivers. Ills. 14 pp. P M—Sept.-Oct., 1916. Steel cofferdam of the pocket type. Its construction. Comments by C. S. Ridley.

Steel Sheetpile Cofferdams for Troy Lock and Dam (73383). D. A. Watt. Ills. 6000 w. E N—Sept. 21, 1916. Second article on elaborate pocket cofferdams for the Hudson River dam.

Colorado River

Control of the Colorado River as Related to the Protection of Imperial Valley (70636 D). J. C. Allison. Ills. 8500 w. A S C E, Pro—May, 1916. The recently constructed hydraulic-fill dam and the possibility of its further use.

Colorado River and Its Utilization (72349 B). E. C. La Rue. Ills. & Maps. 220 pp. U S G S—Water Supply paper 395. Problems and possibilities.

Control of the Colorado River as Related to the Protection of Imperial Valley (73562 D). 5000 w. A S C E, Pro—Sept., 1916. Discussion of J. C. Allison's paper.

Concrete Wharf

Concrete Wharf Exposed to Sea Water and Wave Action at Fort Williams, Maine (73376 B). Francis A. Pope. Ills. 1000 w. P M—Sept.-Oct., 1916. Describes the structure and its present condition.

Danube

La navigation sur le Danube (65983 P). Ch. Dantin. Ills. 3500 w. Gen Civ—Nov. 13, 1915. Political and commercial history of the Danube.

Dikes

Scheuren en afschuingen van zeedijken, en een Middel om deze te voorkomen (74205 B). Ills. 7800 w. Ing—Sept. 9, 1916. Means of preventing cracks and slides of dikes and embankments, with simple methods of calculating pressures, etc.

Docks

New Buffalo, Rochester & Pittsburgh Dock at Buffalo (72919). Ills. 800 w.

Dredgers

R A G—Sept. 1, 1916. Dock for handling heavy materials, and its equipment.

Dredgers

Two More Types of Dredgers (73705 A). Ills. 1500 w. Enr—Sept. 15, 1916. The dredgers Walrus and Flamingo.

Dredges

Operation of Hydraulic Pipe-Line Dredges in the Mobile, Ala., District (71961 B). J. M. Pratt. Ills. 6500 w. P M—July-Aug., 1916. Conditions, operation, requirements, rules, etc.

Pipe Line Dredges (71960 B). E. J. Dent. Ills. 8000 w. P M—July-Aug., 1916. Essential features of design.

The United States Seagoing Dredge, Col. P. S. Michie (71962 B). Ills. 27 pp. P M—July-Aug., 1916. Description, trial data, and report of recent operations.

Dredging

Electric Dredge Used on River Improvement in Washington (68662). J. H. Walter. Ills. 1500 w. E N—March 9, 1916. Design and construction.

The Economics of Ladder Dredgers and Steam Hoppers (69794 N). Harold Berridge. 15 pp. I C E, No. 3979—1915. Costs; comparisons.

Large Suction Dredges Depend on High Velocity for Extraordinary Output (69549). Ills. 2500 w. E R—April, 1916. Work at Toronto.

See Dredges under MARINE AND NAVAL ENGINEERING.

Dutch Indies

De Rapporten der Indische Havencommissie (68801 B). C. L. M. Lambrechtsen van Ritthem. Ills. 7000 w. Ing—Feb. 5, 1916. Abstract from report of commission on harbors in Dutch Indies.

Erosion

Le charriage des alluvions par les cours d'eau (71330 B). Felix Droubet. Ills. 5500 w. Gn Cr—June 10, 1916. Erosive action of alluvion in streams upon hydraulic machines and in reservoirs.

European Ports

Die Hafenanlagen an der See (73515 B). C. Zschokke. Ills. 2200 w. Serial, 1st part. S B—Aug. 26, 1916. Description of harbor works at Genoa, Dieppe, and other places.

Le Port De Bordeaux (73516 B). A. Pawbowski. Ills. 4400 w. Gn Cv—Sept. 2, 1916. Improvements now being carried out along the water front.

Flood Control

Physiographic Principles Manifest in the History of Attempted Control of Yellow and Mississippi Rivers (73375 B). Henry M. Eakin. 22 pp. P M—Sept.-Oct., 1916. Discussion of the article on "The Effect of Levees on the Flow of

WATERWAYS AND HARBORS**Flood Prevention**

Sediment in Rivers," by Col. C. McD. Townsend.

Some of the Problems in the Flood Control of the White-Stock and Puyallup Rivers (73333 A). William J. Roberts, with discussion. Map. & Ills. P N S E—May-June, 1916. Details of work.

"Cat and Kitten" Holes in Outlet of Dam Control High and Low Flood Discharges (72406). Ills. 2000 w. E R—Aug. 5, 1916. Features of Columbus flood-relief plans.

Flood Control in Los Angeles County in California (68011). Ills. 4200 w. E N—Feb. 10, 1916. Serial, 1st part. Abstract of report of board of engineers.

Control of Mountain Torrents by Check Dams (68188). Frank H. Olmsted. Ills. 2100 w. E N—Feb. 17, 1916. Abstract of study of method.

Flood Protection in Indiana (68113 B). W. K. Hatt. With discussion. Maps. 7000 w. Ind Eng Soc—1915. Problems and work of flood commission.

Progress Under the Conservancy Law of Ohio (65807 A). Kenneth C. Grant. 4500 w. Engrs' Soc of Penn, Jour—Oct., 1915. Flood legislation.

Flood Prevention

Progress Report of the Special Committee on Floods and Flood Prevention (66731 D). 6500 w. A S C E—Dec., 1915.

Discussion on Floods and Flood Prevention (69086 D). 3000 w. A S C E, Pro—March, 1916. Discussion on Progress Report of Special Committee.

Flood Protection Plans for Dayton, O. (69042). Map. 3300 w. Wis E—March, 1916. Outlines of plans adopted; problems met.

Discussion on Floods and Flood Prevention (73563 D). 6000 w. A S C E, Pro—Sept., 1916. Continued discussion of Progress Report of Special Committee.

Final Flood-Protection Plan for Miami Valley (69376). Map. 1500 w. E N—April 6, 1916. Retarding basins and channel improvement.

Retarding Basin Plant of Flood Control for Dayton, O., and the Miami Valley (69898). Arthur E. Morgan. Ills. 2000 w. E & C—April 26, 1916. Extracts from chief engineer's report.

Floods and Flood Prevention (69917 D). Ills. 5500 w. A S C E, Pro—April, 1916. Continued discussion of Progress Report of Special Committee.

Flood Protection in Indianapolis (69442 A). Ills. 2000 w. Mun E—April, 1916. Methods and results.

Small Check Dams, in Series, Lessen Flood Velocities in California Ravines

Floods

WATERWAYS AND HARBORS

Illinois River

(70375). Harry F. Olmsted. Ills. 2000 w. E R—May 13, 1916. Serial, 1st part. Experiments near Los Angeles.

Memphis Flood Protection (70333). Ills. 4000 w. E N—May 11, 1916. New levees; drainage pumped.

Discussion on Floods and Flood Prevention (72824 D). 5000 w. A S C E, Pro—Aug., 1916. Discussion of Progress Report of Special Committee.

Million-Dollar Project, Just Started, Will Remove Flood Menace at Erie, Pa. (72563). Farley Gannett. 2500 w. E R—Aug. 19, 1916. Concrete conduit two miles long to carry flow of Mill Creek.

Floods and Flood Prevention (70643 D). Ills. 6000 w. A S C E, Pro—May, 1916. Continued discussion of Progress Report of Special Committee.

Floods

San Luis Rey River Floods of January, 1916 (68376). Edward R. Bowen. Ills. 1800 w. E N—Feb. 24, 1916. Records of two floods; review of damages near Oceanside, Calif.

De ramp in Noord-Holland (68800 B). V. I. P. De Cloq van Kuffeler. Ills. 3500 w. Ing—Feb. 5, 1916. Report of damage of recent floods in Holland.

Disastrous Floods in Southern California (69354). Ills. 1500 w. R A G—April 7, 1916. Damage and reconstruction.

California Rainfall and Runoff and Recent Floods (69514). M. J. Bartell and R. P. McIntosh. 2400 w. E N—April 13, 1916. General review, with special reference to Jan., 1916.

Record Flood from Melting Snows Passes Through Rochester, N. Y. (69385). James P. Wells. Ills. 2000 w. E R—April 8, 1916. Genesee River data.

Flood Conditions at New Orleans as Affected by the Divorcement of the Atchafalaya and Mississippi Rivers (71037 B). J. R. Kemper. 1800 w. L E S, Pro—June, 1916. Effect upon flood stages that would result.

Recent Serious Floods in Eastern Iowa (71520). Ills. 1500 w. R A G—June 30, 1916. Causes derailment, losses in bridges, etc.

Some Recent Aspects of Flood Control (71764 A). R. M. Riegel. 3500 w. C C E—June, 1916. Influences responsible for floods and methods of controlling them.

France

Le Régime des voies navigables en France (71319 C + D). G. Espitalier. 20 pp. S E I N—Mar.-Apr., 1916. Waterways of France and their economic development.

Galveston

Galveston Storm Repairs (68517). N. T. Blackburn. Ills. 1600 w. E N—March 2, 1916. Sea-wall, boulevard and conduits.

Galveston Adopts Plan to Strengthen Its Waterfront Defense Against Future Storms (65571). Ills. 1000 w. Eng Rec—Nov. 6, 1915. Plan adopted.

Genoa

Per il porto di Genova (66277 B). L. Coen Gagli. 2700 w. M T—Nov. 20, 1915. Status of new work undertaken for the port of Genoa.

Glasgow

The Improvement of the River Clyde and Harbor of Glasgow, 1873-1914. (69807 N). Thomas Mason, with discussion. 2 plates. 75 pp. I C E, No. 4141—March 9, 1915. Progress.

Halifax

Halifax Ocean Terminals (66354). Ills. 3900 w. E N—Dec. 9, 1915. Harbor work by Canadian Government.

Ocean Terminals Under Construction Expected to Make Halifax an Important Port (67557). Ills. 3000 w. E R—Jan. 22, 1916. Serial, 1st Part. Proposed harbor works.

New Ocean Terminals at Halifax, N. S. (67101). T. W. J. Lynch. Ills. 1800 w. Cn E—Jan. 6, 1916. Serial, 1st Part. General description.

Harbors

Fishguard Harbor Works (72008 A). Plate & Ills. 2500 w. Eng—July 7, 1916. Detailed description.

Canadian Terminal Harbors on the Great Lakes (73932). Map. 7000 w. Cn E—Oct. 12, 1916. From paper by F. W. Cowie on "Canadian Ports." Particularly the terminal harbors at Fort William and Port Arthur.

Havana

Construcción de estacadas en el Puerto de la Habana por la Compañía de los Puertos de Cuba (67733 A). Ills. 17 pp. S C I Rv—Jan., 1916. Project for new pier construction in Havana harbor and other Cuban ports.

Humboldt Bay

Construction of Concrete Block at End of South Jetty, Humboldt Bay, California (67745 N). George F. Whittemore. Ills. 11 pp. Prof Mem—Jan.-Feb., 1916. Monolith for protection against waves.

Houston

Development of Inland Ocean Port at Houston, Tex. (70621). Ills. 1500 w. E N—May 25, 1916. Details of system.

Illinois River

Engineers Allocate All Uses of Illinois River—Floods, Farming, and Fisheries

Inland Waterways

WATERWAYS AND HARBORS

Meters

(71559). 2000 w. E R—July 1, 1916. From report of John W. Alvord and Charles B. Burdick.

Inland Waterways

The Real Truth About Our Waterways (67256). Joseph E. Ransdell. 4500 w. M Rd—Jan. 13, 1916. Reply to ex-Senator Burton's article in the Jan. issue of *Munsey's Magazine*.

International Waterways

The International Joint Commission (65314). Lawrence J. Burpee. Extract from article in *Univ. Mag.* 3800 w. Can Engr—Oct. 28, 1915. Questions relating to boundary waters between United States and Canada.

Italy

I progetti Averone per la sistemazione idraulica dei territori da Cremona al Mare (70196 B). 2500 w. M T—April 20, 1916. Serial, 1st part. Discussion of Averone's scheme for hydraulic system in territory between Cremona and the sea, in Italy.

Jetties

Brush-and-Stone Jetties Prove Effective at Ventnor City and Longport, New Jersey (71297). W. I. Risley. Ills. 2000 w. E R—June 24, 1916. Succeed where timber jetties fail.

Lake Michigan

The Currents of Lake Michigan and Their Influence on the Climate of the Neighboring States (71895 B). C. McD. Townsend, with discussion. Ills. 7000 w. W S E, J1—April, 1916. Results of investigations and observations.

Lake Ports

Port Problems of the Great Lakes 66041 A). William George Bruce. 2000 w. M Rv—Dec., 1915. Analysis of factors governing harbor improvements.

La Rochelle

Les Ports Français Et La Guerre (74232 B). A. Pawlowski. Ills. 5300 w. Gn Cv—Oct. 7, 1916. Harbor improvements, commerce, etc., of La Rochelle.

Levees

Mississippi River Flood Records Studied with Relation to Levee Grades (69239). A. L. Dabney. Map. 3500 w. E R—April 1, 1916. Analysis of high water records.

Levee System Is Expected to Protect Memphis Against Future Floods (70968). J. H. Weatherford. Ills. 3500 w. E R—June 10, 1916. Main features.

Hydraulic-Fill and Wheeled-Scrapers for Levees (72060). Ills. 1900 w. E N—July 27, 1916. Methods employed in large drainage project.

See same heading under *Construction*.

Consult Classification of the Index. See page 7.

Lock Gates

Service and Guard Gates for Third Lock at St. Marys Falls Canal (73372 B). Isaac De Young. Ills. 34 pp. P M—Sept.-Oct., 1916. Design, construction and cost.

Locks

Steel Cofferdam of Pocket Type Successful for Lock on Cape Fear River (73080). Ills. 1800 w. E R—Sept. 9, 1916. Detailed description.

Improving Rapide Flat Canal Lock Entrance (66836). Ills. 4000 w. Cn E—Dec. 30, 1915. Sinking cribs and reconstructing wall, etc., in one of St. Lawrence river canals.

Notes on the Construction of Locks B, C, and D, Cumberland River (70123 B). John S. Butler. Ills. 18 pp. P M—May-June, 1916. Details and costs.

Lift-Locks on the Trent Canal, Canada (71178 A). Plate & Ills. 700 w. Eng—June 9, 1916. Serial, 1st part. Detailed description.

Log Conveyor

Long Log and Block Conveyor at Hinckley Dam (69093). S. Riswick. Ills. 800 w. E N—March 23, 1916. Device on New York State Barge Canal.

Loire

La Loire et le port de Nantes (70145 C + D). Kaufman. Ills. 102 pp. P C An—Sept.-Oct., 1915. Improvements on the Loire and the harbor of Nantes.

Louisiana Intracoastal Canal

The Intracoastal Canal in Louisiana and Methods of Dredging (70119 B). T. E. L. Lipsey, with remarks by Edward H. Schultz. Ills. 34 pp. P M—May-June, 1916. History of project and details of work.

Mains

Connecting Narrows Siphon to Staten Island Main (74147). Ills. 500 w. E N—Oct. 26, 1916. Methods described. Method of Tapping a 6-Ft. Main into Concrete and Steel Shaft Under Pressure (73849). James Skelton. 600 w. E & C—Oct. 11, 1916. Details at Toronto.

Pipe Galleries and the Location of Mains (74123 N). Charles B. Burdick. Ills. 3000 w. A W W A, J1—Sept., 1916. Questions sent to different cities, with tabulated replies. Practice of large cities in Europe and America.

Metal Flumes

Remarkable Metal Flumes Built in the West (73937). Ills. 600 w. M & E W—Oct. 14, 1916. A 10,000-ft. metal water flume in Colorado.

Meters

See MEASUREMENT.

Michigan

Michigan

The Need of State Supervision of the Waters of Michigan (68383 N). Clarence T. Johnston. Also discussion. 6000 w. Mich Engr—Vol. 33, 1915.

Mississippi River

Winter Work in the Construction and Repair of Dams and Shore Protections in the United States Improvement of the Upper Mississippi River (68934). C. W. Durham. Ills. 1600 w. E & C—March 15, 1916. Details of methods used and advantages of winter work.

Monaco

Les travaux du port de Monaco (68836 B). R. Chauvet. Ills. 3500 w. Gn Cv—Feb. 26, 1916. Harbor improvements at Monaco.

Muscle Shoals

Proposed Co-operation in Muscle Shoals Project Unjustly Criticised (70485). H. Burgess. Map. 4000 w. E R—May 20, 1916. Defense of plan of private and government development.

New Orleans

The Port Facilities of New Orleans (66040 A). Ernest M. Loeb. Address at Great Lakes Waterways Conference. 4000 w. M Rv—Dec., 1915. Summary of methods of administration.

New Orleans Record for Succession of Storms Broken (65563). Map. 1500 w. Eng Rec—Nov. 6, 1915. Hurricane damage.

The Hurricane of Sept. 29th, 1915, and Subsequent Heavy Rainfalls (65436 N). Geo. G. Earl. Special report to Sewerage and Water Board of New Orleans.

N. Y. Harbor

The Pollution of New York Harbor and Its Remedy (72632 N). Kenneth Allen. Ills. 5000 w. Conn Soc Civ Engrs—1916. Results of a study of harbor conditions.

New Zealand

Improvement Works, Otago Harbor (69806 N). John Blair Mason. Plate. 5000 w. I C E, No. 4114—1916. In New Zealand.

Niagara

Conservation and Preservation at Niagara (67546). 1500 w. W E—Jan., 1916. Abstract of lecture by Francis Shenehon. Effects of water diversions on navigation and other questions.

Omaha

Water Basin for City of Omaha Constructed by Day Labor, Using New Special Devices (74167). Homer V. Knouse. Ills. 2500 w. E R—Oct. 28, 1916. Methods effecting economy.

Panama Canal

Economic Aspects of the Panama Canal (66515 N). G. G. Huebner. 5500

WATERWAYS AND HARBORS

Panama Canal

w. A E R—Dec., 1915. Effect on routes; commerce; industries.

Annual Report of the Governor of the Panama Canal (67020 N). Geo. W. Goethals. 62 pp. Aug., 1915. Engineering work and other matters.

The Slides at Panama (68201 A). Rolla C. Carpenter. Maps and Ills. 4000 w. S J I E—Feb., 1916. General exposition.

Some Engineering Problems of the Panama Canal in Their Relation to Geology and Topography (68725 N). Donald F. MacDonald. Ills. 77 pp. U S B M—Bul 86. Bearing of topographic and geologic conditions on certain of the problems encountered.

Slides at the Panama Canal. (68444). George W. Goethals, in supplement to Canal Record. Ills. 2600 w. R R—Feb. 26, 1916. Serial, 1st part. History of the trouble, with methods of removal and prevention.

Report of Commission on the Panama Canal Slides. (68774 A). Edited by Rolla C. Carpenter. Ills. 3000 w. S J I E—March, 1916. Synopsis with quotations and conclusions.

Water-Supply of Panama Canal Under Operating Conditions (69692). R. Z. Kirkpatrick. Ills. 2600 w. E N—April 27, 1916. Report on first year of operation.

The Spillways of the Panama Canal (69763 B). Ills. 6 plates. 4000 w. B S C E, JI—April, 1916. At Gatun and Miraflores.

First Year's Operation of the Locks of the Panama Canal (71897 B). F. C. Clark and R. H. Whitehead, with discussion. Ills. 9500 w. W S E, JI—April, 1916. Details of the operation.

Mechanics of the Panama Canal Slides (72038 N). George F. Becker. 9 pp. U S G S, Prof paper 98-N—July 25, 1916. Geographical study.

Who Pays for the Panama Canal? (71519 A). C. E. Grunsky. 1800 w. S M—July, 1916. Principles which should control canal tolls.

Goethals on Panama Slides (65945). Ills. Also editorial. 4800 w. Eng News—Nov. 25, 1915. Report of George W. Goethals to the Sec. of War.

Ten Million Yards of Material Must Be Removed to Stop Panama Canal Slides (66005). Ills. 4000 w. Eng Rec—Nov. 27, 1915.

Philadelphia

Modern Port Improvements in Philadelphia (65527 A). John Meigs. 8000 w. Jour Am Soc of Marine Draftsmen—Oct., 1915. Present situation and plans for development.

Philippines**Philippines**

Note on the Tidal Variation of Springs and Deep Wells in the Philippine Islands (73568 N). George W. Heise. 700 w. P JI S—May, 1916. Variation in quantity, but little, if any, in quality.

Piers

Chicago Builds Triple Service Pier. (68417 A). G. H. Manlove. Ills. 700 w. M Rv—March 1916. Freight, passenger and recreation; pier No. 2.

Construction of the 46th Street Pier, New York (73943). Ills. 1500 w. Cnt—Oct, 1916. Methods.

Pier Structures

Two-Story Shed for New York's Fortysixth Street Pier Will Be 969 Feet Long (68674). Charles W. Stamford. Ills. 1000 w. E R—May 27, 1916. Details of steel structure.

Pollution

Pollution of Boundary Waters (70786). Ills. 3500 w. Cn E—June 1, 1916. Summary of recent report by Earle Bernard Phelps.

The Pollution of New York Harbor and Its Remedy (70769). Abridged paper by Kenneth Allen, read before Conn. Soc. of Civ. Engrs. Ills. 1800 w. E & C—May 31, 1916. Results of experimental studies.

Port Equipment

Mechanical Equipment Used in the Port of New Orleans (71677 A). William von Phul, with discussion. Ills. 9000 w. A S M E, JI—July, 1916. Description of port and its difficulties, and installations of interest.

Port Facilities

Port Facilities and View on Expansion (65672). Edward F. McSweeney. Address at convention of Atlantic Deeper Waterways Assn. 3500 w. Mfrs' Rec—Nov. 11, 1915. Conditions in America; need of merchant marine; difficulties.

Review of 1915

Docks, Harbors and Waterways in 1915 (67530 A). 3000 w. Enr—Jan. 7, 1916. Serial, 1st Part. Some of the works completed and in progress.

River and Harbor

Remarks on River and Harbor Improvement by the United States in the Connecticut District (72636 N). G. E. Verrill. Ills. 7500 w. Conn Soc Civ Engrs—1916. Outlines the work.

Warrior River Improvement to Benefit Vast Territory (72264). Richard F. Johnston. Ills. 4000 w. M Rd—Aug. 3, 1916. Reviews commercial and industrial possibilities of this river in Alabama.

River Control

Pumping Station Will Make Deep Idaho Lake Available as Equalizer for

WATERWAYS AND HARBORS**River Improvement**

Bear River (71820). Ills. 1500 w. E R—July 15, 1916. Peculiar topography responsible for unique development.

Possible Regulation of Flow of St. Joseph River by System of Storage Reservoirs (71930 B). Wihfred Cook. 2800 w. M E—1916. Work already done.

High Levees Will Protect Indianapolis from Floods (65562). Ills. 2500 w. Eng Rec—Nov. 6, 1915. Barrier of earth and concrete; construction methods.

Indianapolis Flood Protection (65825). Ills. 3000 w. Eng News—Nov. 18, 1915.

See also Floods, under *Waterways and Harbors*.

River Diversion

Diversion of the River Don at Hadfield's Works (71005 A). Ills. & Plate. 1200 w. Enr—May 26, 1916. Details of the work.

River Improvement

Improving Navigation on the Upper Mississippi near Le Claire, Iowa (66789). Ills. 1100 w. E R—Dec. 25, 1915. Canal with lock and closing dam.

The Warrior River—Its Advantages to the Birmingham District (66540). Y. A. Dyer. 2000 w. M Rd—Dec. 16, 1915. Value of improvements on this difficult stream.

Improvement of River Banks of Harrisburg, Pa. (67871 A). Farley Gannett. Ills. 2000 w. Mun E—Feb., 1916. Work accomplished and proposed.

Note sur l'aménagement de la Garonne entre Bordeaux et le Bec d'Ambès. (68815 C + D). Lefort. Ills. 44 pp. P C An—July-Aug., 1915. General study of improvement work on Garonne between Bordeaux and Bec d'Ambès.

Bank Protection Above Sibley Bridge; Santa Fe Ry. (69371). Ills. 1900 w. E N—April 6, 1916. On Missouri River.

The Rangoon River-Training Works (69598 A). George Cunningham Buchanan. Abstract of paper read before Inst. of Civ. Engrs. Ills & Plates. 3000 w. Eng—March 31, 1916. Improvement of third port of India.

Large River Wall of Unusual Design at Cedar Rapids (69208). Ills. 1800 w. E N—March 30, 1916. L-shaped; reinforced-concrete.

The Design of a Drift-Barrier Across White River, Near Auburn, Washington (69907 D). H. H. Wolff. Ills. 1800 w. A S C E, Pro—April, 1916. Eliminating drift from mountain stream.

Placing Rock in Mississippi River Shore Protection (70125 B). A. L. Richards. Ills. 7 pp. P M—May-June, 1916. Details of practice.

Use of Plank or Lumber Apron Mat for Shore Protection on the Upper Mississippi

Consult Classification of the Index. See page 7.

River Traffic

River between the Wisconsin River and Leclaire, Iowa (70124 B). S. Edwards and Robert Iakisch. Ills. 9 pp. P M—May-June, 1916. Details of construction.

Improving the Ohio at Louisville (71772). Ills. 1200 w. M Rd—July 13, 1916. Louisville and Portland canal being enlarged.

The Improvement of Rainwater Bar, Tombigbee River, Alabama (71966 B). F. H. Reed. Ills. 2000 w. P M—July-Aug., 1916. Interesting on account of conditions and methods.

River Traffic

River Traffic Awaits Improvements (69188 A). C. F. Williams. Ills. 1200 w. M Rv—April, 1916. Ohio River traffic will increase.

Riveted Joints

Selecting Economical Type of Riveted Joint for Steel Pipes and Standpipes (73923). Frank H. Carter. 2000 w. E R—Oct. 14, 1916. Tables and diagrams as result of investigation.

Rock Excavation

See Excavation under Construction.

San Francisco

The Waterway at the Mare Island Navy Yard (65619). M. H. Peck. Ills. 5800 w. W Engng—Nov., 1915. Deep-water channel, easily maintained.

Shore Protection

Cause and Prevention of Storm Erosion on Gulf Coast (66141). Gerald O. Case. Ills. 3500 w. E N—Dec. 2, 1915. Investigation of recent damage.

Holland Develops New Types of Shore Protection (67560). Ills. 1000 w. E R—Jan. 22, 1916. Growing use of reinforced concrete. Notes from paper by John W. Thierry.

Shore at Venice, California, Best Protected by Permanent Sea Wall and Low Groins (67176). Ills. 5500 w. E R—Jan. 8, 1916. Report of Leeds and Barnard discussing methods of coast preservation.

Sea Walls of Various Designs Discussed and Compared (67079). Ills. 1200 w. E R—Jan. 29, 1916. Venice, Cal.

Experiments Upon Mortar, and Diatomaceous Earth as Puzzolana, in Sea-Water; with Special Reference to Groynes in Denmark (69810 N). A. Poulsen (Abridged). Ills. 4000 w. I C E, No. 4089—1915.

The Preservation of Sandy Beaches in the Vicinity of New York City (70633 D). Elliott J. Dent. Ills. 6500 w. A S C E, Pro—May, 1916. Study of effect of wave action and means of protection.

WATERWAYS AND HARBORS

Weirs

Tests of Backing for Flexible Concrete River Mattress (70908). Ills. 1300 w. E N—June 8, 1916. Details of Japanese method.

The Preservation of Sandy Beaches in the Vicinity of New York City (72821 D). Ills. 10 pp. A S C E, Pro—Aug., 1916. Discussion of Elliott J. Dent's paper.

South America

Conditions on the West Coast of South America (65850 A). A. B. Lueder. Ills. 2500 w. Cornell Civ Engr—Nov., 1915. Coasts and harbors; need of improvements.

Stream Pollution

Essence of Laws Governing Stream Pollution in the United States. (68894). Le Roy K. Sherman. 2000 w. E & C—March 29, 1916.

Typhoid

An Epidemic of Typhoid Fever Due to the Use of a Polluted Water Supply at the 1915 Assembly of Old Salem Chautauqua (74130 N). Ills. 2000 w. A W W A, JI—Sept., 1916. Discussion of Harry F. Ferguson's paper.

The Typhoid Toll (74129 N). 78 pp. A W W A, JI—Sept., 1916. Discussion of George A. Johnson's paper.

Valparaiso

The Valparaiso Port Works. (69022 A). Plan. 3500 w. Enr—March 3, 1916. Progress in Chile.

Venice

Port Channels of Venice Kept Clear by Tidal Movement Properly Controlled (65876). 1800 w. Eng Rec—Nov. 20, 1915. Prof. Luigi Luiggi describes effective jetties. Suggestions applicable to all estuaries.

Warrior System

The Transportation of Coal on the Warrior System (70120 B). G. K. Little. Ills. 19 pp. P M—May-June, 1916. Figures on methods and costs.

Washouts

Eight Plate-Girder Spans Over Gila River Washed Out (69696). Ills. 1000 w. E N—April 27, 1916. Arizona Eastern RR. bridge.

Waterpipe

An English Admission of the Superiority of American Waterpipe (73852). Percy G. Donald in *The Ironmonger*. 1500 w. E & C—Oct. 11, 1916. Abstracts from article showing results of comparison under like conditions.

Weirs

Movable Sector Weir Near Bremen (72013 A). Ills. 1000 w. Eng—July 7, 1916. Bear-trap weir on the Weser River.

Consult Classification of the Index. See page 7.

Welland Canal**Welland Canal**

Progress on the New Welland Ship Canal (65703). Ills. 1600 w. Can Engr—Nov. 11, 1916. Reviews construction work during past year.

Economic and Strategic Aspects of Enlargement of Welland Canal and of Construction of Georgian Bay Ship Canal. (68558). R. W. Leonard. 4500 w. Cn E—March 2, 1916. Read before Can. Soc. of Civ. Engrs. Cost, advantages

MISCELLANY**Military Engineering**

and disadvantages.

Contractors' Methods on Welland Ship Canal Work Present Interesting Variations (74052). Ills. 4500 w. E R—Oct. 21, 1916. Traveling concrete tower used. See Grouting under *Construction*.

Zuyder Zee

Een ontwerp voor den afsluitdijk der Zuiderzee in gewapend beton (74210 B). C. Wolterbeek. Ills. 7100 w. Ing—Sept. 23, 1916. Enclosing the Zuyder Zee

MISCELLANY**Camps**

Construction of Canada's Biggest Military Camp (71987). W. A. Young. Ills. 4000 w. Cn E—July 20, 1916. Methods followed.

With the 22d Corps of Engineers at Camp Whitman (71556). Robert K. Tomlin, Jr. Ills. 4000 w. E R—July 1, 1916. Work of engineers in preparing the site.

The Mexican Border for Health (71773). Courtney DeKalb. 2000 w. M Rd—July 13, 1916. Climatic conditions, perils to health, and how to meet them.

La construction et l'organisation (72101). Ills. 3000 w. Gn Cv—July 1, 1916. Construction and organization of Belgian Concentration camps in Holland.

Civil Engineering

Address at the Annual Convention, in Pittsburgh, Pa., June 27, 1916 (72761 D). Clemens Herschel. 2500 w. A S C E, Pro—Aug., 1916. Advancement of the profession of the civil engineer.

Channel Projects

Cross-Channel Communication (73531). 2000 w. T E S—Aug. 25, 1916. Review of various plans for bridges, tunnels and car ferries.

Le Tunnel Sous La Manche (73505 B). P. De Launoy. Ills. 2500 w. La Nt—Aug. 5, 1916. General outline of the English Channel tunnel project.

Community Building

Engineer's Work Puts Community Building on Sound Economic Basis (70208). James Z. George. 2500 w. E R—May 6, 1916. Industrial work should be based on thorough engineering investigation.

Co-operation

Engineering Co-operation (70493 A). R. W. Parkhurst. 1500 w. C C E—May, 1916. Plan for organizing societies.

Design

The Principle of Similitude in Engineering Design (73464 A). T. E. Stanton. 5500 w. Eng—Sept. 15, 1916. Read be-

fore the British Assn. Illustrations of the usefulness of this principle.

Engineering

What Can Best Be Done to Advance the Interests of the Engineering Profession in the United States? (72837 B). J. A. L. Waddell. 98 pp. E S W P, Pro—July, 1916. Suggestions, with general discussion.

Engineers and Contractors

The Relation of Engineers and Contractors (69906). J. C. Pinney, Jr. 2800 w. Wis E—April, 1916. From standpoint of engineer.

Forests

Les bois du Canada (71320 B). C. G. Piche. 8000 w. R T C—May, 1916. Canadian forests, production and uses.

Fortifications

Field Fortifications, Sieges and Demolitions. (68975). Thomas M. Robins. Excerpts from lecture in N. Y. City. Ills. 5500 w. E & M J—March 18, 1916. Trenches and accessory features, tools used, explosives, etc.

Locating Fires

Locating Snow Shed Fires by Transit (72859). From a report by Niles Searls. Ills. 700 w. E & C—Aug. 30, 1916. Methods and results.

Military Engineering

Specialized Experience of Engineers and Contractors Vital to Country's Defense (65720). George Perrine. Ills. 1500 w. Eng Rec—Nov. 13, 1915.

A Retrospect (67531 A). 5500 w. Enr—Jan. 7, 1916. Editorial review of the work of engineers in connection with the war.

Engineering in the Great European War (70491 A). Frank W. Skinner. 3500 w. C C E—May, 1916.

Military Engineering (71996 A). George A. Zinn, with discussion and appendix. 17000 w. E C P, Pro—July, 1916. Also course of study and reading. First of four lectures outlining the art of war.

Consult Classification of the Index. See page 7.

Military Engineers

Military Engineering (71997 A). George A. Zinn. Second of four lectures. 11500 w. E C P, Pro—July, 1917. Deals with field engineering.

The Engineer Corps, U. S. A. (72000 A). S. A. Cheney. From "Fundamentals of Military Service," by Lincoln C. Andrews. Ills. 5500 w. E C P, Pro—July, 1916. The service.

Military Engineering (72681 A). George A. Zinn. Third of four lectures, with discussion. 10,000 w. E C P, Pro—Aug., 1916. Field and siege engineering.

Military Service for Civil Engineers (72630 N). William M. Black. 4800 w. Conn Soc Civ Engrs—1916. How to prepare for effective service.

Military Engineering (73316 A). George A. Zinn. Last of a series of four lectures. Also discussion. 11000 w. E C P, Pro—Sept., 1916. Considers seacoast defense.

Military Engineers

Engineer Officers' Reserve Requirements Fixed (72462). 2500 w. E R—Aug. 12, 1916. Gen. W. W. Black explains procedure in applying for commissions.

Field-Artillery Service Should Attract Engineers (72672). Ernest McCullough. Ills. 4200 w. E N—Aug. 24, 1916. Modern artilleryman's job.

Records

Value of Concise Records to the Engineer (73379). Ray S. Huey. 3000 w. S & I—Sept., 1916. Outlines ways to gather valuable data.

Review of 1915

Review of the Year (66914). 14500 w. E R—Jan. 1, 1916. Editorial.

MISCELLANY**Weather Bureau**

Engineering in America in 1915. (69024 A). 1800 w. Enr—March 3, 1916. Serial, 1st part. Editorial review.

Scotland

Engineering Work in Scotland, 1864-1914 (69795 N). Benjamin Hall Blyth. Map. 42 pp. I C E—Nov. 3, 1914. Presidential address to the Institution of Civil Engineers.

Stumps

Methods of Removing Stumps by Blasting (72476). Thomas M. Knight. Ills. 1000 w. E & C—Aug. 16, 1916. Improved methods.

Sugar Plantation

Engineer of Modern Sugar Plantation Has to Deal with Varied Problems (65333). Samuel Vickess. Ills. 2500 w. Eng Rec—Oct. 30, 1915. Plant of Ni-quero Co. in Cuba.

Trenches

Intrenching (71613 A). Carl Gayler. 2500 w. E C St L, JI—May-June, 1917.

Water Routes

Traffic Routes from the Lakes to the Seaboard (73586). Map. 2000 w. E N—Sept. 28, 1916. How Canadian wheat gets to the ocean.

Weather Bureau

What the United States Weather Bureau is Doing in California. (69137 A). William H. Alexander. Ills. 8000 w. C E S, JI—March, 1916. With discussion.

Suggested Changes and Extensions of the United States Weather Bureau Service in California. (69081 D). 1500 w. A S C E, Pro—March, 1916. Discussion of paper by G. S. Brickley and C. H. Lee.

ELECTRICAL ENGINEERING

COMMUNICATION	107	MEASUREMENT	138
ELECTRO-CHEMISTRY	112	POWER APPLICATIONS	143
ELECTRO-PHYSICS	115	TRANSFORMERS	148
GENERATING STATIONS	119	TRANSMISSION AND DISTRIBUTION	150
GENERATORS AND MOTORS.....	126	MISCELLANY	156
ILLUMINATION	132		

Acoustics

Acoustics

Acoustics as Applied to the Telephone Instrument (73632). Ray H. Manson. 3000 w. Tly—Sept. 30, 1916. Use of the human voice in telephoning.

Automatic Exchange

Paisley Automatic Telephone Exchange (73099 A). J. Hedley. Ills. 1000 w. Eln—Aug. 25, 1916. Installation in Scotland put in use July 15th.

Automatic Telephony

Discussion on "Automatic Switchboard Telephone System of Los Angeles" (Campbell), San Francisco, Cal., Sept. 17, 1916 (69530 D). 3000 w. A I E E, Pro—April, 1916.

Cable Bug

The Cable Bug and Its Ravages in Southern California (67184). Albert Schuler. Ills. 2000 w. T E—Jan. 8, 1916. A beetle which bores holes in lead sheathing.

Cable Laying

Laying Submarine Cables Across the Golden Gate. (68576). Ills. 1500 w. El W—March 4, 1916. Messenger-cable method used in a notable achievement under trying conditions.

Cable Losses

The Losses in Cables at High Frequencies (17166 B). Edwin F. Northrup and R. G. Thompson. Ills. 17 pp. F I, JI—July, 1916. Investigation to determine what combination will give a cable best suited for high frequencies.

Cables

Untersuchungen an Telefonkabeln (65403 B). Ernst Felix Petritsch. Ills. 3500 w. E u M—Sept. 12, 1915. Serial, 1st part. Study of characteristics of telephone cables.

COMMUNICATION

Ground Antennas

Practical Kinks in Cable Maintenance (67825 A). Elmer E. Daicey. Read before Ind. Tel. Assn., San Francisco. 1800 w. T E—Feb., 1916.

Practical Methods of Locating Telephone Cable Trouble (68339). O. F. Tallman. 3000 w. Tly—Feb. 26, 1916. Old and new methods.

Notes on Some Small Points Relating to Duplex Balance on Long-Submarine Cables (69844 N). Walter Judd. 600 w. I E E, JI—April 1, 1916. Observations by W. Gaye.

Alternating-Current Submarine Telegraphy (69230). Diagrams. 3500 w. El R & W E—April 1, 1916. Apparatus of George O. Squier.

Discussion on "Submarine Cable Rapid Telegraphy; Ocean and Inter-Continental Telephony" (Bela Gati), San Francisco, Cal., Sept. 17, 1915 (71916 D). 1500 w. A I E E, Pro—July, 1916.

Crystal Detector

Sui Rivelatori a Cristalli Della Onde Usati Nella Radiotelegrafia (74217 B). Ills. 1600 w. Ind—Sept. 17, 1916. Various types of crystal ware detectors for wireless telegraphy.

Cuba

Telephone Progress and Development in Cuban Republic (73783). Illus. 1800 w. Ely—Oct. 7, 1916. Rapid progress during six years.

Faults

Faults on Telegraph and Telephone Circuits (72524 A). G. Edmondson. Abstract of paper read before Ry. Sig. Engrs. 2500 w. R E—Aug., 1916. English methods of locating faults.

Ground Antennas

A Few Experiments with Ground Antennas (74104 D). Leonard F. Fuller.

Consult Classification of the Index. See page 7.

Induction

800 w. I R E Pro—Oct., 1916. Polar energy distribution curves of various types of low antennas are given. A study of radiations.

Induction

Some Problems of Inductive Interference (70806 A). L. T. Merwin. 2500 w. T E—June, 1916. From the writer's experience.

Inductive Interference

Inductive Interference as a Practical Problem (73367 D). A. H. Griswold and R. W. Mastick. Diagrams. 35 pp. A I E E, Pro—Sept., 1916. Reviews important aspects and indicates solution of the problems.

Interference

Discussion on "Report of Joint Committee on Inductive Interference," San Francisco, Cal., Sept. 17, 1915. (68760 D). 5500 w. A I E E, Pro—March, 1916. Progress of investigations carried on.

Japan

The Development of the Telephone System in Japan (70780). Morisaburo Tonogawa. Ills. 1500 w. Tly—June 3, 1916. Abstract of a short history.

Jumper Wires

Re-Using Short Lengths of Released Jumper Wires (72081). J. W. Powell. 600 w. Tly—July 29, 1916. Methods of measuring the lengths.

Microphones

On Microphones and Microphonic Contacts (68079 A). P. O. Pedersen. Ills. 2500 w. Eln—Jan. 28, 1916. Serial, 1st part. Tests.

The Transmitter in Transmission Problems (72233 A). H. S. Sheppard. 2000 w. T E—Aug., 1916. Theory of the carbon granule microphone with some experimental data.

Poles

Discussion on "Recent Results Obtained from the Preservative Treatment of Telephone Poles" (Rhodes and Hosford), St. Louis, Mo., October 19, 1915 (69527 D). 2500 w. A I E E, Pro—April, 1916.

Pupin Coils

Résultats obtenus en France par l'emploi des lignes Pupinisées ((68810 D). L. Cahen. Ills. 15 pp. S I E, Bul—Jan. 1916. French results with lines for long-distance communication loaded with Pupin coils.

Radiation

Notes on Radiation from Horizontal Antennas (74103 D). Charles A. Culver. 1500 w. I R E, Pro—Oct., 1916. Experiments described.

Radio Sets

Recent Standard Radio Sets (72650 D). Harry Shoemaker, with discussion. Ills.

COMMUNICATION**Radiotelegraphy**

6000 w. I R E, Pro—Aug., 1916. Description of recent sets of Marconi Co.

Some Small Direct Current Sets (72651 D). Bowden Washington, with discussion. Ills. 4000 w. I R E, Pro—Aug., 1916. Descriptive. Applications of the Chaffee gap.

Radio-telegraphy

Note on the Resistance of Radiotelegraphic Antennas (65964 N). L. W. Austin. 500 w. U. S. Bureau of Stand. Sci paper 257—Oct. 16, 1915. Study of rise of antenna resistance curve.

Some Recent Advances in Long Distance Radio-Telegraphy (66551 A). W. C. Ballard. Diagrams. 2000 w. S J I E—Dec., 1915.

Discussion on "Continuous Waves in Long-Distance Radio-Telegraphy" (Fuller), New York, April 9, 1915 (66662 D). 3000 w. A I E E—Dec., 1915.

Some Considerations on the Marconi High-Power Transmitting Plant (66681 A). N. Skritsky Abstract of paper in *Pro. Elec.-Tech. Inst.*, Petrograd. 3000 w. Eln—Dec. 10, 1915. Experiments and conclusions.

The Signaling Range in Radiotelegraphy (66136). John L. Hogan, Jr. Chart. 700 w. El W—Dec. 4, 1915. Measuring effect of antenna height, current and wave-length upon distance of transmission.

Electrical Constants of Compound Antennas (67305). A. F. Puchstein. 700 w. El W—Jan. 15, 1916. Method for frequency where capacity and inductance are not uniformly distributed.

A Synopsis of the Development of Wireless Telegraphy (68142 A). H. E. Hallborg. 3000 w. A S M D, JI—Jan., 1916. Theory and practical application.

Long-Distance Radio Transmission. (68795 A). Louis Cohen. 800 w. Eln—Feb. 25, 1916. Three formulas and results.

The Propagation of Electric Waves at the Surface of the Earth and the Ionized Layer of Atmosphere. (68794 A). H. Nagaoaka. 700 w. Eln—Feb. 25, 1916. Development of theory.

Note on the Resistance of Radiotelegraphic Antennas. (68730 N). L. W. Austin. 600 w. U S B S—Feb. 3, 1916. Curves, with explanatory notes of their application.

Effect of Imperfect Dielectrics in the Field of a Radiotelegraphic Antenna (69449 N). John M. Miller. 1500 w. U S B S, Sci paper 269—March 20, 1916. Dielectric absorption.

Variations in Nocturnal Transmission (69489 D). A. Hoyt Taylor and Albert S. Blatterman. Ills. Also discussion.

Consult Classification of the Index. See page 7.

Radiotelegraphy

7500 w. I R E—April, 1916. Experiments on interference theory of "fading" and "swinging."

The Theory and Design of Radio-Telegraphic Transformers (69490 D). Fulton Cutting. Ills. Also discussion. 9000 w. I R E—April, 1916. Mathematical study; measuring apparatus, and other considerations.

Detectors in Wireless Telegraphy (69646 N). Wilder D. Bancroft. 11 pp. A E I S—April, 1916. Methods of operation.

German Portable Wireless-Telegraph Sets (69596 A). Ills. 600 w. Eng—March 31, 1916. "Telefunken" sets taken in South Africa.

Experiments at the U. S. Naval Radio Station Darien, Canal Zone (71236 D). Louis W. Austin, with discussion. 18 pp. I R E, Pro—June, 1916. Strength of signals from a number of stations.

The Mechanism of Radiation and Propagation in Radio Communication (71237 D). Fritz Lowenstein. Diagrams. 10 pp. I R E, Pro—June, 1916. Theories of Edison, Tesla, and Sommerfeld.

Radio in Alaska (71234 D). A. H. Ginman. Ills. 10 pp. I R E, Pro—June, 1916. Ketchikan radio station and the work of the Marconi Co.

Recent Improvements in Radio Communication (71685). A. F. Van Dyck. Ills. 4000 w. E I J—July, 1916. Methods of generation and reception.

Arc Oscillations in Coupled Circuits (72653 D). Hidetsuga Yagi, with discussion. 2500 w. I R E, Pro—Aug., 1916. Principles, illustrated by diagrams.

Recent Patents in Radiotelegraphy and Radiotelephony (72521 A). W. Eccles. Ills. 2000 w. Eln—July 28, 1916. Serial, 1st part. Rise of thermionic currents into practical importance.

Calculation of the Capacity of Radiotelegraph Antennae, Including the Effects of Masts and Buildings (73288 A). G. W. O. Howe. 1800 w. Eln—Sept. 8, 1916. Serial, 1st part. Shows that it is a relatively simple matter to pre-determine the capacity.

Radiotelegraphy: A Retrospect of Twenty Years (73478 A). J. A. Fleming. Ills. 4800 w. Eln—Sept. 8, 1916. Historically interesting.

Dispositivi Recenti di Radiotelegrafia e Radiotelefonía (74228 B). Ills. 2600 w. Serial, 1st part. Ind—Oct. 1, 1916. Generators and amplifiers recently tested for wireless service.

Impiego dell'Arco a Vapore di Mercurio Nella Radiotelegrafia (74215 B). Ills. 1000 w. Ind—Sept. 10, 1916. Use of mercury vapor arc in wireless telegraphy.

COMMUNICATION

Radiotelephony

Physical Aspects of Radio-Telegraphy (74101). John L. Hogan Jr. Ills. 23 pp. I R E Pro—Oct., 1916. Development; outlining general physical basis of all communication systems; operation, disturbances, etc.

Radio-Telegraphy Over Great Distances (74081 A). W. Duddell. 3000 w. Eln—Oct. 6, 1916. Abstract from *Ann. des Postes*, etc. Methods used to produce oscillations, and the receiving apparatus.

See also Radio Towers under CIVIL ENGINEERING. Construction.

Radio Station

Arlington Radio Station and Its Activities in the General Scheme of Naval Radio Communication (74102 D). William H. G. Bullard. Ills. 27 pp. I R E, Pro—Oct., 1916. Detailed description of station at Radio, Va., and questions related.

The Naval Radio Stations of the Panama Canal Zone (72601 B). R. S. Crenshaw. Ills. 10 pp. U S N I, Pro—July-Aug., 1916. Details and stations.

Radiotelephony

Magnetic Amplifier for Radiotelephony (68426 A). E. F. W. Alexanderson and S. P. Mixdorf. Ills. 2500 w. G E R—March, 1916. New device for high-speed work.

The Methods Employed for the Wireless Communication of Speech (69865 A). Philip R. Coursey (Abstract). 2500 w. Eln—April 7, 1916. Review.

A Magnetic Amplifier for Radio Telephony (69488 D). E. F. W. Alexanderson, assisted by S. P. Nixdorf. Ills. Also discussion. 5500 w. I R E—April, 1916. For control of radio frequency currents.

Sullo stato attuale della radiotelefonía (70161 C + D). Attilio Brauzzi. Ills. 79 pp. R M—Mar., 1916. Review of present status of radiotelephony.

Magnetic Amplifier for Radiotelephony (71168 A). E. F. W. Alexanderson and S. P. Nixdorf. Ills. 1500 w. Eln—June 9, 1916. Apparatus which makes possible radio telephony and radiotelegraphy on a large scale.

Latest Steps in Wireless Telephony (65989 A). Harold Pender. Ills. 4000 w. Engng Mag—Dec., 1915. Technical aspects of recent long-distance telephony.

Transatlantic Wireless Telephony Accomplished (65362). John J. Carty. 1500 w. Telephony—Oct. 30, 1915. Between Arlington and Paris.

Ein neues System für drahtlose Telephonie (65978 B). August Hund. Ills. 3000 w. E u M—Oct. 31, 1915. New device, the "Pleiotron," for facilitating wireless speech.

Receivers

On Telephonic Measurements in a Radio Receiver (72652 D). J. Zenneck. 2000 w. I R E, Pro—Aug., 1916. Measurement by the audibility method, and advantages.

Receivers

Principles of Receiver Design and Practical Limitations (72934). E. W. Kellogg. Ills. 2500 w. Tly—Sept. 2, 1916. Mechanical and electrical properties of telephone receivers.

Rotating Gap

Operation of a Non-Synchronous Rotating Gap (73246). A. S. Blatterman. 3000 w. El W—Sept. 16, 1916. Investigations to determine correct condenser capacity.

Splicing

Tying and Splicing of Copper Wire as Affecting Service (69832). W. H. Collins. Ills. 1500 w. Tly—April 22, 1916.

Speech Recorder

The True Nature of Speech With Application to a Voice-Operated Phonographic Alphabet Writing Machine (67682 D). John B. Flowers. Ills. 3000 w. A I E E, Pro—Feb., 1916. Investigation of speech and device for recording it automatically on paper.

Discussion on "The True Nature of Speech" (Flowers), New York, Feb. 9, 1916 (71918 D). Ills. 16 pp. A & E E, Pro—July, 1916.

Standardization

What Standardization Means to the Operating Companies (67301). W. H. Hay. Read before U. S. Ind. Tel. Assn. Maps. 2000 w. Tly—Jan. 15, 1916. Importance of standards and conditions corrected.

Submarine Cables

The Installation of a Submarine Cable Across the Golden Gate (73965). S. J. Lisburger, in *Pacific Service Mag.* 3300 w. Wis E—Oct., 1916. Details of work and its difficulties.

Telegraphy

The Speed of Submarine Telegraphy (73470 A). Edward Raymond Barker. 4500 w. Eln—Sept. 15, 1916. Historical sketch.

The Principles of Modern Printing Telegraphy (68344 N). H. H. Harrison. Ills. 68 pp. I E E, Jour—Feb. 15, 1916. With full discussion.

Increasing the Traffic Capacity of Telegraph Lines by Acoustic Tuning. (68792 A). Ills. 1800 w. El R—Feb. 25, 1916. Details of a multiplex system of Dr. Oscar Srnka.

Discussion on "The Principles of Modern Printing Telegraphy." (68791 N).

COMMUNICATION**Telephony**

7500 w. I E E, JI—March 1, 1916. Continued discussion of Harrison's paper.

The Story of Land Telegraphy (73468 A). H. H. Harrison. 3500 w. Eln—Sept. 15, 1916. Historical review of progress.

Telephone Law

The Telephone Law of Minnesota (70069 A). Charles Elmquist. Address before Minn. Ind. Tel. Assn. 2500 w. T E—May, 1916. Scope of the law.

Telephonometry

Telephonometer (72234 A). B. S. Cohen. Abstract of paper read before the Inst. of P. O. Elec. Engrs. Ills. 3000 w. T E—Aug., 1916. Standard cable measurements.

Telephony

Superimposed or "Phantom" Telephone Circuits (65629 A). Ills. 2200 w. Elect'n, Lond—Oct. 22, 1915. Serial, 1st part. Advantages and economies.

Improvement of Long Distance Telephone Transmission (65578). C. J. Larson. Report to E. Penn. Ind. Tel. Assn. 2000 w. Telephony—Nov. 6, 1915. Suggestions.

The Study of Transmission Problems by Means of Vectors (65360). E. W. Kellogg. Diagrams. 2500 w. Telephony—Oct. 30, 1915. Method and application.

Economic, Social and Political Conditions in Europe Which Influence Government Ownership of the Telephone (66752). James P. Duncan. 2500 w. El R S W E—Dec. 25, 1915. Origin and conditions affecting development.

Notes on Telephone Plant Organization (66134). F. Day. 4500 w. El R & W E—Dec. 4, 1915. Basic principles and practical applications.

The Year Nineteen Fifteen in the Telephone Industry (66865). Stanley R. Edwards. 7500 w. Tly—Jan. 1, 1915. Review.

Telephone Transmission and Its Relation to a Plant (66166). H. D. Currier. 2300 w. Tly—Dec. 4, 1915. Importance in telephone business. Considerations involved in study.

The Development of the National Telephone System (66194 A). M. C. Rarty. 1500 w. A S M E JI—Dec., 1915. Brief review.

Engineering Features of Physical Connection (67824 A). Kempster B. Miller. 500 w. T E—Feb., 1916. Extract from report to Chicago City Council. Between manual and automatic system.

Notes on Heat Coil Protectors in Telephone Exchanges (67911). R. V. Achatz. 3500 w. Tly—Feb. 5, 1916. Characteristics.

Telephony

COMMUNICATION

X RAYS

The Wisconsin Supreme Court on Physical Connection. (68708). 3500 w. Tly—March 11, 1916. Serial, 1st part. Full text of recent decision.

La téléphonie a grande distance et les lignes téléphoniques système Krarup (69612 D). Devaux-Charbonnel. Ills. 10 pp. S I E, Bul—Feb., 1916. Long-distance telephony, especially after the Krarup system.

Causes of Telephone "Noise" and Its Elimination (71132). Frank T. Caldwell. 1200 w. El W—June 17, 1916. Explains disturbances and how to remedy them.

Earth Connections for Telephone Exchanges (72752 A). W. H. Grinstead. Ills. 3300 w. Eln—Aug. 18, 1916. Reasons for earthing the battery.

Long-Distance and Cable Telephony (Underground and Submarine). (72611 A). B. S. Cohen and J. G. Hill. 3000 w. Eln—Aug. 11, 1916. Serial, 1st part. Conductors, means of extending range of communication, etc.

Long Distance Telephony (72634 N). Edward H. Everitt. Ills. 3000 w. Conn Soc Civ Engrs—1916. Features of the service.

Wireless Communication of Speech (72235 A). Philip R. Coursey. 2200 w. T E—Aug., 1916. Explanatory.

Telephone Operating Economics—Its Relation to Service (73435). H. M. Friendly. 1600 w. Tly—Sept. 23, 1916. Serial, 1st part. Advantages of commission regulation and technical supervision.

The Story of the Telephone (73471 A). J. E. Kingsbury. 3500 w. Eln—Sept. 15, 1916. The development in England.

Transmission and Its Importance in Exchange Operation (73239). C. E. Creecy. Ills. 3000 w. Tly—Sept. 16, 1916. Basic facts.

Eliminating Transmission Line Telephone Troubles (73071). E. P. Peck. Ills. 2500 w. El W—Sept. 9, 1916. Methods for protecting telephones and operators.

Long-Distance Telephony (73472 A). B. S. Cohen. 2500 w. Eln—Sept. 15, 1916. Early history, modern progress, problems solved, etc.

Plain Facts About the Maintenance of Telephone Plants (72935). R. L. Wright. 1700 w. Tly—Sept. 2, 1916. What maintenance includes and how it should be taken care of.

Technical Matters of Interest to Small Exchange Managers (73062). H. N. Faris. 4000 w. Tly—Sept. 9, 1916. Read at Oklahoma convention. Fundamentals and their treatment.

Long Distance Transmission of Telephone Currents (74062). F. B. Dunn.

2500 w. Tly—Oct. 21, 1916. Mathematical developments of theory of transmission lines.

For the Convenience of the Customer (71534). Ills. 4000 w. El W—July 1, 1916. Methods used to secure prompt service.

Hitches, Knots, Loops, and Ties for Telephone Plant Men (71827). D. S. Hilborn and C. L. Brown. Ills. 1500 w. Tly—July 15, 1916. Best practice.

Wave Distortion and Telephonic Speech Transmission (71989). E. W. Kellogg. 4500 w. Tly—July 22, 1916. Discussion of speech production and hearing.

Telephone Relays

Sui Relais O Ripetitori Telefonica (73504 B). Ills. 2500 w. Ind—Aug. 6, 1916. Description of principal kinds of telephonic relays and repeaters, particularly European types.

Transmission Standards

Tentative Standards of Transmission (66172 A). 4500 w. T E—Dec., 1915. Recommended by Independent Telephone Association of America.

Transmitter

An Impulse Excitation Transmitter (71235 D). Ellery W. Stone, with discussion. Ills. 17 pp. I R E, Pro—June, 1916. Best conditions explained. Experiments.

Transmitters

The High Frequency Output of Telephone Transmitters (72444). E. W. Kellogg. 2500 w. Tly—Aug. 12, 1916. Serial, 1st part. Efficiency of design.

Resistance of Carbon Contact in Solid Back Transmitter (73063). A. L. Clark. 2000 w. Tly—Sept. 9, 1916. Abstract from *Phys. Rev.* Variations and their cause.

Underground Cables

An Underground Telegraph Cable Installation in Pueblo, Mexico (66628 A). William B. Hale. Ills. 1000 w. El R—Dec. 3, 1915. Details of work.

Underground Cable on the Pennsylvania Railroad (67232 A). Ills. 2500 w. R G—Dec. 24, 1915. Details of construction and factors leading to adoption of type in use.

X Rays

Examen des Métaux par les Rayons X (74200 C + D). H. Pilon. Ills. 1000 w. R Met—Jan.-Feb., 1916. Use of X-rays for examination of iron and aluminum autogenous welds.

Les Tubes a Rayons X (74231 B). Ills. 1900 w. I El—Oct. 10, 1916. Recent types of tubes and their applications.

Ammonia

ELECTRO-CHEMISTRY

Electrolysis

Ammonia

The Production of Ammonia from Cyanamid (67316). W. S. Landis. Read before Am. Inst. of Chem. Engrs. 4000 w. M & C E—Jan. 15, 1916. Details of process and plant, with costs.

Batteries

Thin-Plate Batteries for Reserve Service (71663). Philip Torchio. Ills. 1200 w. El W—July 8, 1916. Certain plate thicknesses for emergency service.

Chlorine

Liquid Chlorine (68106). Dr. G. Ornstein. Read before Am. Elec.-Chem. Soc. 5000 w. M & C E—Feb. 15, 1916. Processes, history, advantages, uses, etc. Electrolytic Chlorine for Laundries (72091). H. P. Hill. Ills. 800 w. El W—July 29, 1916. Production of bleaching solution from salt and water.

Contact Potentials

The Relation Between Contact Potentials and Electrochemical Action (69664 N). Irving Langmuir. Ills. 55 pp. A El S—April, 1916. Theoretical discussion.

Corrosion

The Electrolytic Process for Preventing Corrosion and Scale (66812 A). Ills. 2000 w. C G—Dec. 17, 1915. Cumberland process.

The Cumberland Electrolytic Process (68095 A). Ills. 1800 w. M E & N A—Feb., 1916. For prevention of corrosion.

A Curious Case of Corrosion of Tinned Sheet Copper (72912 N). Paul D. Merica. Ills. 1500 w. A I Mt—Sept., 1916. Explanation of corrosion of roofing.

Observations Upon the Atmospheric Corrosion of Commercial Sheet Iron (73406 N). E. A. Richardson and L. T. Richardson. Ills. 3000 w. A El S—Sept., 1916. Particularly in regard to the influence of copper and mill scale.

Development

Electrochemical Possibilities of the Pacific Coast States as Compared with Those of Sweden and Norway (71576). J. W. Beckman. Read before Am. Chem. Soc. 4000 w. M & C E—July 1, 1916. Critical comparison of conditions.

Discussion on "Electrochemical Industries and Their Interest in the Development of Water Powers" (Addicks), "Water Power Development and the Food Problem" (Cushman), "Relation of Water Power to Transportation" (Stillwell), Washington, D. C., April 26, 1916 (71921 D). 13 pp. A I E E, Pro—July, 1916.

Dry Cells

Characteristics of Small Dry Cells 73399 N). C. F. Burgess. 2000 w. A El

S—Sept., 1916. Tests of service for flash light lamps.

Electric Furnaces

An Electrically Heated Bomb Furnace (67645). D. F. Calhane and H. A. Lavene. Ills. 3500 w. M & C E—Feb. 1, 1916. For reactions under pressure.

An Electric Arc Furnace for Laboratory Use (71092). Oliver P. Watts. Ills. 1700 w. M & C E—June 15, 1916. Small tilting furnace of 10 lb. capacity.

Electric Furnaces as Applied to Non-Ferrous Metallurgy (71203 A). Alfred Stansfield. 7500 w. C E M—June, 1916. Serial, 1st part. Read before Inst. of Metals. Electrolytic furnaces and electrothermic smelting furnaces are considered in present number.

Electric Furnace Control (70705 A). John A. Seede. Ills. 2000 w. G E R—June, 1916. Reviews development of control of electric arc furnaces.

Coke as a Reducing Agent in the Electric Smelting Furnace (71094). R. C. Gosrow. 4000 w. M & C E—June 15, 1916. Discusses the influence on the smelting process.

The Electric Furnace (72567). R. H. Grigg. Ills. 4500 w. B W—Aug., 1916. Types and their operating cost.

Electrically Heated Furnaces for the Laboratory (72613 A). K. Arndt. From *Elek. Zeit.* Ills. 1200 w. Eln—Aug. 11, 1916. Types used.

Electrochemistry

Electrochemistry (73486 A). F. Mollwo Perkin. 2500 w. Eln—Sept. 15, 1916. Progress in the United Kingdom.

The Undeveloped Powers of the South (73128 A). W. R. Whitney. 2500 w. M Rd—Sept. 14, 1916. Study of southern conditions; value of water power in developing electrochemical industries, etc.

Electrodes

An Electro-Chemical Action on Glass (71155 A). F. F. S. Bryson. Ills. 1700 w. Eng—June 2, 1916. Disintegrating effect observed on glass electrode holders of an interrupter.

Electrolysis

Motion Pictures of Electrolysis (65960). Ills. 500 w. Sci Am Sup—Nov. 27, 1915. Their aid in scientific investigation.

Effects of Electrolysis on Engineering Structures (66446 B). Albert F. Ganz. 10000 w. S I—Oct., 1915. Effects of stray currents, remedial measures.

Electrolysis

Earth Resistance and Its Relation to Electrolysis of Underground Structures (67370 N). Burton McCollum and K. H. Logan. 45 pp. U S B S, No 26—Dec.

Electrolysis

20, 1915. Importance of soil resistivity, giving results of measurements and methods of protection.

Electrolysis and Its Mitigation (67346 N). E. B. Rosa and Burton McCollum. Ills. 140 pp. U S B S, No 52—Dec. 27, 1915. Principally a discussion of the prevention of electrolysis in metallic structures, with conclusions as to available methods.

The Influence of Frequency of Alternating of Infrequency Reversed Current on Electrolytic Corrosion. (68758 D). Burton McCallum and G. H. Ahlborn. 27 pp. A I E E, Pro—March, 1916. Experimental work. Discussion of results.

On the Electrolysis of Concentrated Hydrochloric Acids Using a Copper Anode (71403 N). F. H. Jeffery. 500 w. Trans Faraday Soc—April, 1916. Experimental investigation.

The Electrolysis of Nitric, Sulphuric and Orthophosphoric Acids, Using a Gold Anode (71402 N). F. H. Jeffery. 4500 w. Trans Faraday Soc—April, 1916. Investigates reactions with a gold anode.

Discussion on "The Influence of Frequency of Alternating or Infrequently-Reversed Current on Electrolytic Corrosion" (McCollum-Ahlborn), New York, March 10, 1916 (71920 D). Ills. 17 pp. A I E E, Pro—July, 1916.

Contributions to the Knowledge of the Electrolysis of Aqueous Solutions of Vanadium Salts (73401 N). Sigfried Fischer, Jr. Ills. 45 pp. A El S—Sept., 1916. Investigations to determine whether or not it is possible to obtain metallic vanadium from aqueous solutions of its salts.

High Temperature Heat Developed During Electrolysis (73397 N). Carl Hering. 1500 w. A El S—Sept., 1916. Properties of the phenomenon of melting steel electrically while immersed in an aqueous solution.

The Electrolytic Recovery of Lead from Brine Leaches (73403 N). Clarence E. Sims and Oliver C. Ralston. Ills. 15 pp. A El S—Sept., 1916. Research to find a commercially feasible process for recovery of values in low-grade lead ore.

Electrolytic Processes

A New Electrolytic Cell for Making Pure Oxygen and Hydrogen (67319). Ills. 2500 w. M & C E—Jan. 15, 1916. Details of the I. O. C. bipolar generator and its operation and efficiency.

Electrometallurgy

The Electrodeposition of Nickel (73404 N). L. D. Hammond. 29 pp. A El S—Sept., 1916. Results of experiments.

Note on the Occurrence and Significance of Twinned Crystals in Electrolytic Copper (72914 N). Henry S. Rawdon.

ELECTRO-CHEMISTRY

Ills. 2000 w. A I Mt—Sept., 1916. Study of conditions of deposition of electrolyte plates and the effects.

Electroplating

A Modern Acid-Dipping, Electroplating and Japanning Plant (66055 A). Horace Niles Trumbull. Ills. 3000 w. G E R—Dec., 1915. Heating and ventilating, medicinal and electrical equipment of hygienic plant.

Copper Cyanide Solutions (66264). W. H. Weber. 1600 w. M I—Dec., 1915. Modern method of preparation.

Chemical Analyses of Electroplaters (67357). W. H. Weber. 1500 w. B W—Jan., 1916. Enabling electroplaters to equip laboratory and analyse all plating solutions.

Boric Acid in a Nickel Solution (68231). E. S. Thompson. 1300 w. B W—Feb., 1916. Factors governing quantity.

How the City Current May Be Used for Plating. (69028). Ills. 2000 w. B W—March, 1916. Methods.

Three Minute Nickel on Die-Castings (69029). E. S. Thompson. 1800 w. B W—March, 1916. Directions.

Some Unsolved Problems of the Electro-Plater (69643 N). George B. Hoga-boom. 7 pp. A El S—April, 1916. Listed.

Rapport sur un procédé de controle permettant d'apprécier rapidement et sans détérioration, la quantité de nickel déposée sur des objets nickelés (69604 C + D). Bacle and Pontio. 6 pp. S E I N, Bul—Jan.-Feb., 1916. New method of estimating the thickness of the nickel coating on objects being nickel plated.

Rapid Nickel Plating (69637 N). Oliver P. Watts. 6 pp. A El S—April, 1916. Experiments.

Addition Agents in the Electro-Deposition of Silver from Silver Nitrate Solutions (69638 N). Frank C. Mathers and John R. Kuebler. 13 pp. A El S—April, 1916. Research.

Peptone as an Agent in Stannous Ammonium Oxalate Baths (69650 N). Frank C. Mathers and Barrett W. Cockrum. 4 pp. A El S—April, 1916. Research.

Tests of Tin Plating Baths (69642 N). Frank C. Mathers and Barrett W. Cockrum. 6 pp. A El S—April, 1916. Research.

High Purity Nickel Anodes Versus Low Purity Anodes (70513). E. S. Thompson. 1200 w. B W—May, 1916.

What the Foreman Plater Ought to Know (71212). Francis A. Shepherd. 4000 w. B W—June, 1916. Concerning soaps, action of limes, rouges, &c.

Notes on Electroplating (72279 A). S. V. Thorp. 1500 w. El R—July 21, 1916.

Consult Classification of the Index. See page 7.

Iron Protection

Serial, 1st part. The plant and dynamo, etc.

Current Efficiencies in Nickel Plating Baths with Rotating Cathodes (73398 N). F. C. Mathers and E. G. Sturdevant. 2500 w. A E I S—Sept., 1916. Shows low current efficiencies are due to impurities.

Depositing Brass and Copper Upon Die Castings, Aluminum and Zinc from Cyanide Solution (74071). E. S. Thompson. 1200 w. B W—Oct., 1916. How to obtain satisfactory results.

Preliminary Studies in the Deposition of Copper in Electrotyping Baths (73400 N). W. Blum, H. D. Hoiler, and H. S. Rawdon. Ills. 2800 w. A E I S—Sept., 1916. Research to determine conditions for the production of satisfactory electrotypes.

Iron Protection

The Protection of Iron by Electroplating (73395 N). Oliver P. Watts, and Paul L. De Verter. 3000 w. A E I S—Sept., 1916. Investigations to determine protection afforded by deposits of different metals.

Italy

Le industrie elettrochimiche in Italia (71331). Arturo Miolati. 2800 w. Ind—June 4, 1916. Reviews electrochemical developments in Italy.

Nitrates

Nitrates and Oxygen Demand (73814 B). F. W. Bruckmiller. 1800 w. J I I & E C—Oct., 1916. Process of nitrate reduction.

La Production Synthetique des Nitrates (74220 B). 1000 w. I E I—Sept. 25, 1916. Synthetic production of nitrates and nitric acid by various methods.

Nitrogen

Fixation of Atmospheric Nitrogen Before Congress. Also, Production of Nitric Acid from Ammonia by the Ostwald Process (69718). 5000 w. M & C E—April 15, 1916. First article mainly from pamphlet by Frank S. Washburn. Second is translation from *Metall und Erz*.

Nitrogen Possibilities as Outlined by the Smithsonian Institution (70761). 1500 w. M R d—June 1, 1916. How the U. S. can become independent in the production of nitrates.

The Manufacture of Ammonium Nitrate, etc., by Electric Power (71425 N). E. Kilburn Scott. Ills. 6500 w. W S I S I, J I—Jan.-Feb., 1916. Furnaces used in Norway, and a three-phase furnace developed by the writer; method of working, &c.

Synthetic Nitric Acid in Connection with the Utilization of Slags and Waste Gases (71426 N). E. Kilburn Scott and Thomas Twynam, with discussion. 3500

ELECTRO-CHEMISTRY

Storage Batteries

w. W S I S I, J I—Jan.-Feb., 1916. Details of the process.

Sources of Nitrogen Compounds in the United States (71867 N). Chester G. Gilbert. 11 pp. Smithsonian Inst (2421)—June 30, 1916. Nature of the problem.

The German Nitrogen Industry (71639 A). Extract from *Frankfurter Handelsblatt*. 1200 w. Eng—June 16, 1916. Increased production and its relation to German agriculture.

Nitrogen Fixation

Fixation of Atmospheric Nitrogen (65895 D). 2500 w. Am Inst of Elec Engrs, Pro—Nov., 1915. Discussion at New York, March 12, 1915, of Leland L. Summers' paper.

The Production of Ammonia from Cyanamid (67759 N). W. S. Landis. Ills. 3500 w. J I I E C—Feb., 1916. Broad survey. Paper before Amer. Inst. Chem. Engrs.

Power Development

Electrochemical Industries and Their Interest in the Development of Water Powers (70416 D). Lawrence Addicks. 3000 w. A I E E, Pro—May, 1916. Urging liberal policy.

Primary Batteries

Dry Cells (69578 A). W. R. Cooper. Ills. 2500 w. E I n—March 31, 1916. Serial, 1st part. Modern cells and methods of testing.

Primary Cells

Some Suggestions as to the Proper Care of Dry Cells (65576). W. W. Kinsley, Jr. Ills. 1000 w. Telephony—Nov. 6, 1915. Handling, storing, and testing.

Potassium Photo-Electric Cells (65961). Herbert E. Ives. Ills. 4000 w. Sci Am Sup—Nov. 27, 1915. Serial, 1st part. Study of the relationship of illumination and current.

Rectifiers

A Mercury-Arc Rectifier for Charging Small Storage Batteries (72886 A). C. M. Green. Ills. 800 w. G E R—Sept., 1916. Mechanical and electrical features.

Refining

The Metal Tie-Up in Electrolytic Refining (73307 A). Lawrence Addicks. 4500 w. M & C E—Sept. 15, 1916. Sources of locked-up values.

Selenium Cells

Selenium Cells (68341 A). W. R. Cooper. 2500 w. E I n—Feb. 11, 1916. Serial, 1st part. Properties; construction.

Storage Batteries

Notes on Storage Batteries (66476 A + D). C. S. McDowell. Curves. 3000 w. A S N E—Nov., 1915. Design and operation.

The Installation and Working of Lead Storage Batteries (66599). R. Rankin.

Consult Classification of the Index. See page 7.

Air Conductivity

Extract from paper before Assn. of Sup. Elect'ns., London. 2000 w. El R & W E—Dec. 18, 1915. Important points, instructions, etc.

Installation and Care of Accumulators (69225 N). Carl A. Cooper. 2500 w. Cw E—March 1, 1916. Serial, 1st part. Point of view of the engineer-in-charge.

Effect of Temperature Upon the Performance of the Edison Storage Battery (73402 N). L. C. Turnock. 18 pp. A El S—Sept., 1916. Results of an investigation of the behavior of the alkaline storage battery.

Some Accumulators of the Past (73477

ELECTRO-CHEMISTRY**Corona**

A). Frank Cawter. 2500 w. Eln—Sept. 15, 1916. Progress and applications. The Active Materials and Electrolyte of the Alkaline Storage Battery (72975 A). L. C. Turnock. 3000 w. M & C E—Sept. 1, 1916. Preparation and testing of the nickelous hydrate, metallic iron, and electrolyte used.

Zinc Dust

Electrolytic Zinc Dust (73405 N). Harry J. Morgan and Oliver C. Ralston. 10 pp. A El S—Sept., 1916. Experiments on the possibility of the production of zinc dust from solutions of zinc.

ELECTRO-PHYSICS**Air Conductivity**

Discussion on "The Electric Strength of Air—VI" (Whitehead), Deer Park, Md., June 29, 1915 (66668 D). Ills. 3500 w. A I E E—Dec., 1915.

Alternating Current

Fundamental Principles of Alternating Current (66170). F. A. Annett. 2500 w. Pwr—Dec. 7, 1915. Serial, 1st part. Explanation of sine curve.

Arc

Unstable States in Arc and Glow (69686 N). W. C. Cady. Ills. 12 pp. A El S—April, 1916. Investigation.

Arc Phenomena

Discussion on "Arc Phenomena" (Collis), San Francisco, Cal., Sept. 16, 1915 (70422 D). Ills. 5800 w. A I E E, Pro—May, 1916.

Arcs

Unstable States in Arc and Glow (65742 A). W. G. Cady. Read before Am. Elec.-Chem. Soc. 3500 w. Met & Chem Engng—Nov., 1915. Phenomena showing unstable nature of some forms of gas discharge, with conclusions.

Arcs in Gases Between Non-Vaporizing Electrodes (68061 B). G. M. J. Mackay and C. V. Ferguson. Ills. 2000 w. F I JI—Feb., 1916. Experiments.

Coil Windings

Die Berücksichtigung des Wicklungsinnes in der theoretischen Elektrotechnik (73539 B). Otto Bloch. Ills. 4000 w. S B—Sept. 9, 1916. Mathematical discussion of the effect of direction of winding of coils, especially in single-phase motors.

Colloidal Solutions

The Transference of Electricity by Colloidal Particles (71401 N). Frank Powis. 1800 w. Trans. Faraday Soc—April, 1916. Method of calculating the mean charge carried by the particles.

Conductors

Effective Resistance and Inductance of Iron and Bimetallic Wires (65972 N). John M. Miller. 60 pp. U S Bureau of Stand—Nov. 8, 1915. Theoretical and experimental investigations. Formula.

Electric Conductors (70012 A). Charles Proteus Steinmetz. 5500 w. G E R—May, 1916. Serial, 1st part. Properties of different kinds.

Variable Conductors (70035 A). C. C. Bidwell. 1800 w. S JI E—May, 1916. Classification.

Contact Electrification

Contact Electrification and the Electric Current (65650 A). Fernando Sanford. 3500 w. Sci M—Nov., 1915. Early experiments and theories.

Continuous Current

Éléments de circuits a courant continu ou a flux continu en parallèle. Application a un mode particulier de production de courant continu dans les arbres de dynamos. Machines a poles conséquents. Extension aux moteurs d'induction (67014 D). Paul Girault. Ills. 29 pp. S I E Bul—Nov., 1915. Elements of circuits with continuous current or continuous parallel flux, mathematically treated. Applications to dynamos, consequent poles and induction motors.

Corona

Comparison of Calculated and Measured Corona Loss Curves (65891 D). 700 w. Am Inst Elec Engrs, Pro—Nov., 1915. Discussion at New York, Feb. 17, 1915, of the paper by F. W. Peek, Jr.

The Corona in Air at Continuous Potentials and Pressures Lower Than Atmospheric (66070 A). Donald Mackenzie. Abstract from *Phys. Rev.* 3500 w. Eln—Nov. 19, 1915. Experiments showing difference between positive and negative corona.

Consult Classification of the Index. See page 7.

Coupled Circuits**Coupled Circuits**

Amplitude Relations in Coupled Circuits (71238 D). E. Leon Chaffee, with discussion. Diagrams. 20 pp. I R E, Pro—June, 1916. Historical survey; method of varying theoretical relations, &c.

Currents

Growth of Current in Circuits of Negative Temperature Coefficient of Resistance (66057 A). F. W. Lyle. 800 w. G E R—Dec., 1915. Applies formula already given and derives new formula.

Dielectrics

The Effects of Transient Voltages on Dielectrics (67686 D). 4000 w. A I E E, Pro—Feb., 1916. Discussion of Peek's paper.

Eddy Currents

Effects of Eddy Currents (72024). W. N. Cross. Ills. 1700 w. Pwr—July 25, 1916. How produced; effect on meters.

Electrical Energy

Preliminary Notes on a New Way of Converting Light into Electrical Energy (71915 N). Theodore W. Case. 10 pp. N Y Elec Soc—June 14, 1916.

Electrodes

Electrode Surface Phenomena (69663 N). William C. Arsem. 5 pp. A E I S—April, 1916. Discussion.

Contact Resistance of Metal Electrodes (69667 N). N. K. Chaney. 16 pp. A E I S—April, 1916. Investigation.

Electromagnetic Machines

Notes on Design of Electromagnetic Machines (71151 A). Stanley Parker Smith. 1500 w. Eln—June 2, 1916. Serial, 1st part. Principles underlying the design of continuous-current machines in the present number.

Electromagnetism

La Réciprocité des Phénomènes Électriques Et Magnétiques (72814 D). Daniel Berthelot. Ills. 15000 w. S I E—June, 1916. Serial, 1st part. Theoretical discussion of the inter-relation of electric and magnetic phenomena.

Electromagnets

Solenoid and Electromagnetic Windings (65889 D). George L. Hedges. 20 pp. Am Inst Elec Engrs, Pro—Nov., 1915. Design is discussed.

Practical Design and Construction of Direct Current Electromagnets (73085). Norman G. Meade. Ills. 1000 w. E I A—Sept., 1916. Serial, 1st part. Details of design and construction of d. c. electromagnets of various types.

Electroscopes

The Electrical Capacity of Gold-Leaf Electroscopes (71714 A). T. Barrett.

ELECTRO-PHYSICS**Impulse Currents**

600 w. Eln—June 23, 1916. Capacity found to be independent of deflection. Abstract of paper read before the Physical Society, London.

Electrostatic Separation

Separazione Elettrostatica dei Minerali (74216 B). Ills. 2600 w. Ind—Sept. 17, 1916. System of Riboni and Bibolini for separation of minerals.

Emissivity

The Emissivity of Metals and Oxides. IV. Iron Oxides (65969 N). George K. Burgess and Paul D. Foote. 1500 w. U S Bureau of Stand—Oct. 28, 1915. Experimental investigation.

Energy

Energy (70690 A). David B. Rushmore. 4800 w. G E R—June, 1916. Sources, forms, classifications. Energy available from winds, waves, tides and solar radiation. Unit of energy; conservation and transformation, etc.

Excess Voltages

Application des ondes rectangulaires a l'étude des surtensions (69675 B). P. Normier. Ills. 4000 w. Ind Elec—April 10, 1916. Application of rectangular waves to study of excess voltages.

"Fibrox"

Examination of the Electrical Properties of "Fibrox" (73656 A). E. F. Northrup. 1500 w. M & C E—Oct. 1, 1916. Details of tests.

Fuses

The Design and Operation of Horn-Gap Fuses (66376). E. A. DiHard. Ills. 2000 w. E I W—Dec. 11, 1915. Suitable types for small outdoor substations, behavior and construction.

Glow

See Arc.

Harmonics

Discussion on "Decomposing Magnetic Fields into Their Higher Harmonics" (Weichsel), St. Louis, Mo., October 20, 1915 (69529 D). 2000 w. A I E E, Pro—April, 1916.

Heating

The Temperature of Field Windings (65712). H. M. Phillips. 1800 w. Elec Rev & W Elect'n—Nov. 13, 1915. Electrical construction.

High Voltage

The Production of Constant High Potential with Moderate Power Capacity. (68420 A). A. W. Hull. Ills. 3500 w. G E R—March, 1916. Method employing the kenotron.

Impulse Currents

Outline of Theory of Impulse Currents (67480 D). Charles P. Steinmetz. 20 pp. A I E E, Pro—Jan., 1916. All

Consult Classification of the Index. See page 7.

Inductance

types of currents derived as special cases of intergration constants.

Discussion on "Outline of Theory of Impulse Currents" (Steinmetz), New York, Jan. 14, 1916 (70426 D). 4000 w. A I E E, Pro—May, 1916.

Inductance

A Study of the Inductance of Four-Terminal Resistance Standards (72097). Francis B. Silsbee. Ills. 47 pp. U S B S, Sci paper No. 281—July 12, 1916. Study of the inductance of electrical resistance of less than one ohm.

Induction

Some Problems of Electromagnetic Induction (65774 A). G. W. O. Howe. Ills. 3000 w. Elect'n, Lond—Nov. 5, 1915. Studies of induction.

Inductive Circuits

Means of Producing a Sparkless Break of an Inductive Circuit (68261 A). 2000 w. Eln—Feb. 4, 1916. Mathematical investigation.

Insulation

Electrical Characteristics of Solid Insulations (65355 A). F. W. Peek, Jr. 3000 w. Gen Elec Rev—Nov., 1915. Laws of breakdown, etc.

Artificial Insulating Materials (68259 A). Ills. 2000 w. Eln—Feb. 4, 1916. Serial, 1st part. Various materials obtainable.

Interpoles

Interpoles, Their Principles and Usage (71811). Gordon Fox. Ills. 5000 w. El R & W. E.—July 15, 1916. Explanation of the theory and action.

Ions

The Migration of the Ions (72070 A). S. W. J. Smith. Abstract of paper before the Phys. Soc. 1200 w. Eln—July 14, 1916. New diagram proposed.

Lightning

Lightning: Its Risks and How to Avoid Them (68419 A). Elihu Thomson, C. A. Adams Louis Bell, D. C. Jackson and A. E. Kennelly. Ills. 4500 w. G E R—March, 1916. Simple methods.

Lightning (71492 A). F. W. Peek, Jr. Ills. 2500 w. G E R—July, 1916. Investigation of the time interval between application of high voltages and failure of insulation.

Lightning Protection (72877). Addison W. Lee. 2500 w. N E—Sept., 1916. Theory.

Magnetism

Temperature Coefficient of Magnetic Permeability Within the Working Range (65965 N). R. L. Sanford. 1500 w. U S Bureau of Stand—Oct. 28, 1915. Work undertaken to determine the magnitude of this temperature effect.

ELECTRO-PHYSICS**Oscillations**

Magnetic Studies of Mechanical Deformation in Certain Ferromagnetic Metals and Alloys (66412 D). H. Hanemann and Paul D. Merica. Ills. 4000 w. A I M E Bul—Dec., 1915. Investigates the mechanical-magnetic properties.

The Effect of Electric Oscillations on the Magnetic Properties of Iron Investigated by the Campograph. (68793 A). J. A. Fleming and P. R. Coursey. 1500 w. Eln—Feb. 25, 1916. Abstract of paper read before the Phys. Soc., London. Study of hysteresis problems.

The Seventh Kelvin Lecture. Lord Kelvin and Terrestrial Magnetism (68788 N). C. Chree. 12500 w. J E E JI—March 1, 1916. Diagrams. Description and cause of variation.

Some Mechanical Analogies in Electricity and Magnetism (69192 A). W. S. Franklin. Ills. 3000 w. G E R—April, 1916. Especially on a. c. phenomena.

Investigation of Magnetic Laws for Steel and Other Materials (69491 B). John D. Ball. 45 pp. F I, JI—April, 1916. Results of investigations.

An Investigation into the Magnetic Behavior of Iron at Very High Frequencies with the Aid of Poulsen-Arc Generator (69843 N). N. W. McLachlan. 5000 w. I E E, JI—April 1, 1916. Methods of measurement, etc.

Correlation of the Magnetic and Mechanical Properties of Steel (69452 N). Charles W. Burrows. Ills. 36 pp. U S B S, Sci. paper 272—March 29, 1916. Review of work done.

Magnetic Testing (69448 N). Ills. 50 pp. U S B S, Circ. 17—March 18, 1916. Methods.

Theories of Magnetism (70011 A). Saul Dushman. 3500 w. G E R—May, 1916. Serial, 1st part. Introduction.

Magnetization by Rotation (70046 A). S. J. Barnett. From *Phys. Rev.* 1800 w. Eln—April 21, 1916. Theory and converse effect; experiments.

Our Earth a Great Magnet (70414 B). L. A. Bauer. Ills. 28 pp. F I, JI—May, 1916. Annual lecture of Carnegie Inst. of Washington.

The Effect of Vacuum-Fusion Upon the Magnetic Properties of Pure Open-Hearth Iron (72281 A). Trygve D. Yensen. Ills. 900 w. Eln—July 21, 1916. Investigation and results.

Nickel Wire

Maximum Watt-Dissipation in Still Air from Nickel Wire and Other Data (72973 A). E. S. Northrup. 1000 w. M & C E—Sept. 1, 1916. Results of experiments.

Oscillations

Production of Undamped Electric Oscillations by Quenched Spark Discharge

Oscillator

ers (65917 A). Hidetaugu Yagi. Ills. 1000 w. Elect'n, Lond—Nov. 12, 1915. How they may be obtained.

The Production of Damped Oscillations (66054 A). Leslie O. Heath. Ills. 3000 w. G E R—Dec., 1915. Three most important ways.

Les oscillations a amortissement complexe (67735 D). A. Blondel and F. Carbenay. Ills. 15 pp. S I E Bul—Dec., 1915. Study of effect of complex damping on oscillations.

Construction of a Lecture-Room Oscillograph (68215). H. G. Crane and C. L. Dawes. Ills. 2500 w. El W—Feb. 19, 1916. Instrument to project waves without distortion.

Electrical Oscillations from Mercury Vapor Tubes (70517 A). Benjamin Liebowitz. Ills. 2000 w. Eln—May 5, 1916. Outlines theory of arc oscillation.

Oscillator

The Plotron Oscillator for Extreme Frequencies (72882 A). William C. White. Ills. 2500 w. G E R—Sept., 1916. The use of the plotron for the production of alternating currents.

Permeability

La perméabilité du fer aux fréquences élevées (67734 D). R. Jouaust. 23 pp. S I E Bul—Dec., 1915. Permeability of iron under high frequencies.

Overloads

Ueberstrom und Ueberstromschutz (67723 B). Wilhelm Schrader. Ills. 2400 w. E K u B—Dec. 24, 1915. Excess currents and protection against them.

Precipitation

Solution of Smoke, Fume and Dust Problems by Electrical Precipitation (66086). Linn Bradley. Address in New York City. 5000 w. M & C E. Dec. 1, 1915.

Recent Progress in Electrical Smoke Precipitation (68399). F. G. Cottrell. Ills. 5500 w. Ed M J—Feb. 26, 1916. Read at 2nd Pan-Am. Sci. Cong. Review of work.

See also Cottrell Process under MECHANICAL ENGINEERING, *Measurement*.

Radiation

Sir J. J. Thomson on Radiation from Atoms and Electrons (69579 A). Ills. 2500 w. Eln—March 31, 1916. Serial, 1st part. Abstract of first three of course of lectures at Royal Inst.

Radiations from Atoms and Electrons (69324 A). 3000 w. Eng—March 17, 1916. Serial, 1st part. Editorial reviews of lectures by J. J. Thomson.

Radiography

Recent Progress in X-Rays and Radiography (73485 A). G. W. C. Kaye. Ills.

ELECTRO-PHYSICS

4000 w. Eln—Sept. 15, 1916. Important developments.

Rays

Sobre los rayos producidos por los rayos Röntgen (65485 N). J. Laub. Ills. 24 pp. Soc Cien Arg An—May-June, 1915. Studies of rays developed by incident X rays.

A Model X-Ray Dark-Room. (66053 A). Wheeler P. Davey. Ills. 1500 w. G E R—Dec., 1915. Details of small and large rooms.

The Production and Utilization of Roentgen Rays (67509 A). J. S. Shearer. 2000 w. S J I E—Jan., 1916. Reviews development.

Discussion on "The Measurement of Dielectric Losses with the Cathode Ray Tube." Deer Park, Md., July 2, 1915. (67481 D). 6500 w. A I E E, Pro—Jan., 1916. John P. Minton's article.

Reluctance

Discussion on "The Reluctance of Some Irregular Magnetic Fields" (Douglas), Deer Park, Md., June 29, 1915. 66673 D). 2500 w. A I E E—Dec., 1915.

Research

Recent Researches in Electricity at the Bureau of Standards (65831 B). E. B. Rosa. Ills. 7500 w. Fr Inst, Jour—Nov., 1915. Survey of current research work of the electrical division.

Resistance

The Electrical Resistance of Some Heat-Treated Copper, Zinc, Nickel Alloys (67657 N). F. C. Thompson. 1500 w. I E E, JI—Jna., 1916. Composition, heat-treatment, annealing.

The Resistance of Moist Sandstone to High and Low Frequency Alternating Currents (69577 A). N. W. McLachlan. 700 w. Eln—March 24, 1916. Experiments and results.

The Laws of Variation of Resistance with Voltage at a Rectifying Contact of Two Solid Conductors, with Applications to the Electric Wave Detector (73709 A). D. Owen. Abstract from *Pro. of Phys. Soc. of London*. 3300 w. Elen—Sept. 22, 1916. Deals with measurements of the resistance of the contact.

New Low Resistance Standards (72612 A). C. V. Drysdale. Ills. 2500 w. Eln—Aug. 11, 1916. Essential features, tests, etc.

Selenium

Propriétés Et Utilisations du Sélénium (72800 B). Ills. 3000 w. I El—May 10, 1916. Serial, 1st part. Discussion of general physical properties of selenium, with numerous charts.

Skin Effect

The Application of Telephone Transmission Formulae to Skin-Effect Prob-

Spark Effect

lems (69842 N). G. W. O. Howe. Diagrams. 4000 w. I E E, JI—April 1, 1916. Study of problem.

Skin Effect on a Return Circuit of Two Adjacent Strap Conductors (69263). H. B. Dwight. 1000 w. El JI—April, 1916. Calculation of skin effect and comparison with tested results.

Spark Effect

The Effect of the Spark on the Oscillations of an Electric Circuit (74105 D). John Stone Stone, with discussion. Diagrams. 27 pp. I R E, Pro—Oct., 1916. Theories are contrasted; developing the more general theory.

Speaking Arc

Electric Oscillatory Phenomena of Speaking Arc (71131). J. Parker Van Zandt. 600 w. El W—June 17, 1916. Arrangements for demonstrating.

Terrestrial Magnetism

Results of Magnetic Observations Made by the United States Coast and Geodetic Survey in 1914 (65885 N). Daniel L. Hazard. 65 pp. U S Coast & Geod Surv—No. 25. Observations, corrections, tables, and descriptions of stations.

Thermo-Electricity

La thermo-électricité des aciers spéciaux (67017 C+D). Eugene L. Dupuy et Albert M. Portevin. Ills. 23 pp. R

GENERATING STATIONS**Buildings**

Met—Aug., 1915. Experiments on thermo-electric phenomena of steel alloys.

Vibrations

Vibrations, Waves and Resonance (74076 A). J. Erskine-Murray. 3800 w. R S A, JI—Oct. 6, 1916. Serial, 1st part. Principles underlying wave motions.

Voltage Waves

The Mathematical Investigation of Voltage Waves Obtained in Testing Iron (66068 A). N. W. McLachlan. 700 w. Eln—Nov. 19, 1915. Critical discussion.

Wave Form

Characteristics of Admittance Type of Wave Form Standard (72376 D). Frederick Bedell. 16 pp. A I E E, Pro—Aug., 1916. Study of a certain type.

Waves

La propagation des ondes électriques a la surface de la terre et la couche ionisée de l'atmosphère (65492 B). H. Nagaoka. 3500 w. Rv Gn Sc—Oct. 30, 1915. Analysis of certain phenomena encountered in radio-communication.

Wave Shapes

The Wave-Shapes Obtaining with Alternating-Current Generators Working Under Steady Short-Circuit Conditions (66851 N). A. E. Clayton. Oscillograms. 20 pp. I E E—Dec., 1915. Detailed study.

GENERATING STATIONS**Accumulators**

The Use of Accumulators in Alternate-Current Stations (66628 A). L. Schroder. Abstract from *Elektro Zeit*. Diagrams. 2000 w. Elect'n, Lond—Oct. 22, 1915. Experiments to test uses.

Alabama

The Future of Water-Power Development in Alabama (65589). Thomas W. Martin. Read before Ala. Lgt. & Trac. Assn. 2500 w. Elec Rev & W Elect'n—Nov. 6, 1915. Shows new uses and new markets for electrical energy.

The Alabama Power Company's System and Its Operation (70707 A). H. H. Dewey and W. E. Mitchell. Ills. 7000 w. G E R—June, 1916. High-tension system for continuous service.

Alaska-Treadwell

Steam-Electric Power Plant of Alaska Mine (66597). Ills. 3000 w. El R & W E—Dec. 18, 1915. Details of recent oil-burning installation.

Auxiliary Plants

Auxiliary Steam Power Plant for Vancouver Island (65609). W. L. Kidston. Ills. 2500 w. Power—Nov. 9, 1915. Put in service one-half hour after completion.

Entwurfsfeststellung des fehlenden Wassers und der demgemäss nötigen Wärmekrafthilfe bei Talsperrenkraftwerken mit wechselnden Druckhöhen. Wasserwirtschaftsplane (67772 B). Leiner. Ills. ZgT—Jan. 10, 1916. Serial, 1st part. Application of graphic analysis to questions of auxiliary power for plants with changeable water conditions.

Birmingham, Eng.

A Temporary Generating Station at Birmingham (66332 A). Ills. 2000 w. Enr—Nov. 26, 1915. English undertaking.

British Columbia

Couteau Power Company Development (72308). A. R. Mackenzie. Ills. 1000 w. Cn E—Aug. 3, 1916. Proposed development described.

Building Plants

Conway Building Power Plant (67320). Thomas Wilson. Ills. 2500 w. Pwr—Jan. 18, 1916. Serial, 1st Part. A 1,200-kw. direct-current office-building plant.

Buildings

Power Station Buildings (71510 B). James N. Hatch, with discussion. Ills.

Consult Classification of the Index. See page 7.

By-Product Power

9000 w. W S E, J1—March, 1916. Planning electric power stations.

By-Product Power

Power with By-Product Recovery (73108 A). T. Roland Wollaston. 1500 w. Enr—Aug. 25, 1916. Possibilities of a scheme for the supply of electric power station.

Central Plants

Cumberland Edison Power Plant (65907). Warren O. Rogers. Ills. 3000 w. Power—Nov. 23, 1915. Equipment arranged on unit basis.

Central Station Practice.

Supply of Single-Phase Loads from Central Stations (74107 D). Philip Torchio. Diagrams. 2000 w. A I E E Pro—Oct., 1916. American station practice.

Central Stations

Rejuvenation of the Power Plant of United Illuminating Co. (67213). J. Breslav. Ills. 1500 w. Pwr—Jan. 11, 1916. Difficulties overcome at New Haven, Conn.

Review of 1915 Central Station Operating Results. (68577). 1500 w. El W—March 4, 1916. Earnings and kw-hour production.

Serving an 8500-Hp. Steel Rolling-Mill Load. (68977). Ills. 1700 w. El W—March 18, 1916. Redesign of 1600-kw. station.

The Trend of Central Station Development (70506). L. A. Ferguson. Ills. 1500 w. El W—May 20, 1916. In Chicago.

The Central Station as a Factor in Industrial Development (70645). R. S. Orr. 1000 w. El J1—June, 1916. Advantages of the consolidation of power-producing machinery.

Developing Efficiency in Central Stations (71570). C. M. Rogers. 3000 w. Pwr—July 4, 1916. Saving by increasing efficiency of boiler plant.

See also Electricity, under *Miscellany*.

Chicago

The Commonwealth Edison Company in the Industry (70503). Ills. 2200 w. El W—May 20, 1916. In Chicago.

China

Electric Generating Stations in China (67389 N). C. A. Middleton Smith. Also discussion. 5500 w. I E E—Jan., 1916. Conditions, development, and outlook.

Electric Generating Stations in China (68258 A). C. A. Middleton Smith. 2000 w. El R—Feb. 4, 1916. Abstract of paper before Hong Kong Sec. of I. E. E., with short discussion.

Combination

See Public Utilities under **CIVIL ENGINEERING, Municipal**.

GENERATING STATIONS**Electric Heating****Combination Plants**

Combination Electric Heating Plant, Laramie, Wyo. (65374). A. E. Anderson. Ills. 3000 w. Power—Nov. 2, 1915. Supplies electric current and district heating.

Converters

Notes on Old and New Converting Plants (73445 A). 3500 w. El R—Sept. 8, 1916. Use of rotary converters.

Current Selling

The Sale of Current to Municipally Owned Distributing Systems by Central Stations (65711). W. Rawson Collier. From a paper before N. E. L. A. 2500 w. Elec Rev & W Elect'n—Nov. 13, 1915. A study.

D. C. Station

The World's Largest Direct Current Station (72452). Fred Allison. Ills. 3000 w. El W—Aug. 12, 1916. Power plant of the Ford Motor Co., in Detroit.

Detroit

The Connors Creek Plant of the Detroit Edison Company (66566 N). C. F. Hirshfeld. Ills. 25 pp. A S M E—Dec., 1915. Problem due to phenomenal growth.

Dispatching

Load Dispatching by New England Power Company (73916). Ills. 2500 w. El W—Oct. 14, 1916. Methods used for a system serving customers in five states.

Distribution Plant

The Distribution Plant of the Johannesburg Municipal Electric Supply System (72261 N). J. H. Dobson, with discussion. 10 pp. S A I E, Trans—May, 1916. Discussion of Mr. Dobson's paper by A. E. Gibbs and others.

Domestic Power

A Distribution System for Domestic Power Service from Commercial and Engineering Standpoints (72384 D). Carl H. Hoge and Edgar R. Perry. 7 pp. A I E E, Pro—Aug., 1916. A new system to take care of this class of business.

Economics

Electricity Supply (66438 N). Charles P. Sparks. 8500 w. I E E J1—Dec., 1915. Inaugural address. Legislation, supply, improvements and progress.

Electrical Sets

Internal-Combustion-Driven Electrical Sets (71715 A). W. A. Tookey. 2000 w. Mch. E—June 30, 1916. Rating of internal-combustion engines.

Electric Heating

Some Features of Domestic Electric Cooking and Heating (72379 D). H. B. Peirce. 10 pp. A I E E, Pro—Aug., 1916. Shows what may be expected by a central

Consult Classification of the Index. See page 7.

Essex Plant

station after such load has been developed. The Resistance Heater as a Load Builder (72488). Edgar F. Collins. Ills. 1500 w. El A—Aug., 1916. Applications.

Essex Plant

Electrical Features of Essex Plant (73626). Ills. 5000 w. P E, C—Oct. 1, 1916. Details of electrical generating control and station-distribution equipment.

Fire Prevention

Fire Prevention in Electrical Stations (73777). H. L. Gannett. 1000 w. El R & W E—Sept. 23, 1916. From *Safety Bul.*, Chicago, Ill.

Fuels

Conditions Under Which Oregon Company Burns Wood (71971). Ills. 2000 w. El W—July 22, 1916. Features of installation of the Oregon Power Co.

Glasgow

The Generation and Distribution of Electrical Energy in Glasgow (66485 N). W. W. Lackie. 32 pp. I E S S—Nov., 1915.

Hospital Plant

New Cincinnati Hospital Plant (70992). Thomas Wilson. Ills. 3000 w. Pwr—June 13, 1916. Modern d. c. plant. Boilers equipped to burn coal or natural gas.

Hydro-Electric

The Lake Spaulding Hydroelectric Development of the Pacific Gas & Electric Co. (65692 A). R. L. Dougherty. Ills. 1500 w. Sib Jour of Engng—Nov., 1915. Detailed description.

Combination Steam and Water Plant (65730). Ills. 1800 w. Prac Engr, Chicago—Nov. 15, 1915. Small plant at Terryville, Conn.

A Hydroelectric Plant on the Savannah River (65864). Ills. 1200 w. Elec Wld—Nov. 20, 1915. A 13000-kva. plant connected with a steam generating station, and a 44000-volt transmission line.

Ten Years of Evolution of Hydro-Electric Units (66651 B). E. B. Ellicott and William B. Jackson. Also discussion. 5000 w. W S E—Oct., 1915. Advance in construction, design and efficiency.

Hydroelectric Station Auxiliary to Steam Plant (66748). Ray K. Holland. Ills. 1500 w. El W—Dec. 25, 1915. The Barton plant near Ann Arbor, Mich. Unusual features.

Hydro-Electric Development in Canadian Prairie Provinces (66399). F. C. Perkins. Ills. 2200 w. P E, C—Dec. 15, 1915. To stimulate industrial growth.

Power Development at Eugenia Falls, Ontario (66123). Ills. 2500 w. Cn E—Dec. 2, 1915. High-head plant on Beaver River.

GENERATING STATIONS**Hydro-Electric**

A New Zealand Hydro-Electric Scheme (66778 A). Ills. 700 w. El R—Dec. 17, 1915. At Ohakune.

Description of a Hydro-Electric Plant in Brazil (67476 A). T. H. Olds. Map and Ills. 3500 w. C C E—Jan., 1916. Latest and best practice.

Kakabeka Falls Power Development (66927). Frank C. Perkins. Ills. 1500 w. N E—Jan., 1916. Development in Ontario.

Five Schemes Considered for Power Development at Kananaskis Falls, Alberta (67291). Harold S. Johnston. Ills. 3000 w. E R—Jan. 15, 1916. Serial, 1st Part. Several schemes analyzed. Reason for plan adopted.

Tacoma Hydro-Electric Power Plant (66922). W. L. Kidston. Ills. 2000 w. Pwr—Jan. 4, 1916. Details of municipal plant.

The Lake Margaret Hydro-Electric Power Works (67524 A). Ills. and plate. 3500 w. Eng—Jan. 7, 1916. Serial, 1st Part. In Tasmania, for mines, railways, etc.

Hydro-Electric Power in New Zealand (68100 N). W. Wilson. Maps. 13500 w. I E E, JI—Feb. 1, 1916. Possibilities, summary of present developments.

Lake Margaret Hydro-Electric Power Scheme (67671 A). Ills. 2500 w. Enr—Jan. 14, 1916. In Tasmania.

Uniform Load Approached by Bulk Supply. (69111). W. N. Ryerson. Ills. 1600 w. El W—March 25, 1916. Water storage systems of Great Northern Company.

Hydro-Electric Development for a Small Town. (68706 N). W. L. Parker. Ills. 1500 w. Civ E—Feb. 1, 1916. Scheme for Tauranga, N. Z.

Waterloo Hydro-Electric Plant. (69153). Norman G. Meade. Ills. 1500 w. Pwr—March 28, 1916. A 3000-hp. low-head plant in Central New York.

La distribution de l'énergie électrique en Catalogne (69610 B). Ch. Dantin. Ills. 2500 w. Gn Cv—March 18, 1916. Power plants and distribution systems for electricity in Catalonia.

The Big Creek Hydro-Electric Development for Pacific Light and Power Corporation, Los Angeles, California (69616). F. M. Thebo. Ills. 10 pp. U S E, JI—March, 1916. General description.

Impulse Wheels Developed for Silt-Laden Water (69779). J. W. Swaren. Ills. 3600 w. E N—April 20, 1916. Cross cut plant, Salt River project, Arizona.

Discussion on "The Combined Operation of Steam and Hydraulic Power in the

Hydro-Electric

GENERATING STATIONS

Manila

Pennsylvania Water and Power Company System" (Walls), and "Supplemental Power for Hydro-electric Systems" (Vaughan), Philadelphia, Pa., Oct. 11, 1915 (70423 D). 2500 w. A I E E, Pro—May, 1916.

The Cedars Rapids Hydro-Electric Development (70709 A). R. C. Muir. Ills. 4500 w. G E R—June, 1916. A 160000 h. p. development.

City of Kamloops Hydro-Electric Plant (71120). H. K. Dutcher. Ills. 3000 w. Cn E—June 15, 1916. Engineering and economic features.

Hydro-Electric Power in New Zealand (70838 N). W. Wilson. Ills. & Maps. 3500 w. Cn E—May 1, 1916. Serial, 1st part. Present and prospective installations in North Island.

Hydro-Electric Undertakings in Spain (71645 A). Ills. 2000 w. Enr—June 16, 1916. Abstract from *Le Genie Civil* giving information concerning power stations of Ebro Irrigation and Power Co.

Das Kraftwerk an der Vieze bei Monthey (72120). L. Kursteiner. Ills. 2500 w. Serial, 1st part. S B—June 17, 1916. Power stations on the Vieze near Monthey, Switzerland.

Electric Power on the Mississippi (72623 A). Day Allen Willey. Ills. 3000 w. C E M—Aug., 1916. Construction of the Keokuk power plant.

Hales Bar Hydro-Electric Power Station of the Chattanooga and Tennessee River Power Company (72201 A). Philip Torchio. Ills. 2000 w. G E R—Aug., 1916. Engineering difficulties encountered in design, construction, and operation.

Jordan River Power Development; Vancouver Island, B. C. (72356 N). Charles A. Lee. Ills. & Maps. 50 pp. C S C E—March 4, 1915. Description of development and history of the work.

Ocoee Power Station No. 2 (72490). M. M. Samuels. Ills. 1800 w. El A—Aug., 1916. Careful planning and construction.

The Stave Falls Power Development of Western Canada Power Company, Limited (72360 N). R. F. Hayward. Ills. 43 pp. C S C E—Oct. 7, 1915. History and description.

The Swedish State Hydro-Electric Power-Station at Alfkärlaby (72399 A). Map, Ills., & Plates. 5000 w. Eng—July 14, 1916. Serial, 1st part. Detailed description.

The Hydroelectric Station on the Pescara River (73287 A). Abstract from *Elektro Zeit*. Ills. 1200 w. Eln—Sept. 8, 1916. Details of plant.

The Small Hydro-Electric Plants in New Zealand (73224 A). Ills. 1800 w.

Enr—Sept. 1, 1916. The New Plymouth plant, and the Tauranga works.

Hydro-Electric Development in South America (73939). Ludwig W. Schmidt. 4000 w. Pwr—Oct. 17, 1916. Possibilities for development.

The Harnessing of the Winnipeg River (74099 A). Map and ills. 2500 w. Eng—Oct. 13, 1916. Serial, 1st part. Abstract of report to the Dominion authorities, considering interesting points.

See also Muscle Shoals under CIVIL ENGINEERING, *Waterways and Harbors*.

See also MECHANICAL ENGINEERING, *Steam Engineering*.

Ice Troubles

See same heading under CIVIL ENGINEERING, *Water Supply*.

Interborough

Power Development for Urban Transportation (69960 A). Clifton W. Wilder. Ills. 4000 w. E M—May, 1916. Advances in recent years.

Interconnections

Electric Service to Interconnected Illinois Towns (70504). Ills. 4500 w. El W—May 20, 1916. Economies of few connected generating stations and unit management.

Isolated Plants

Isolated Power-House for Factories (65356 A). W. E. Francis. Ills. 5000 w. Gen Elec Rev—Nov., 1915. Information to apply in design, construction, and operation.

The Electrification of Isolated Factories (67938 A). 3000 w. Enr—Jan. 21, 1916. Serial, 1st part. Prime movers, electrical system, erection, etc.

Reducing Manufacturing Costs (68074). Ills. 2000 w. P E, C—Feb. 15, 1916. Private plant more economical.

Modern Isolated Plant of the B. & O. Railroad. (68440). Ills. 2000 w. P E, C—March 1, 1916. At Chicago terminal.

Power in a Wholesale Bakery (72478). Ills. 2800 w. P E, C—Aug. 15, 1916. Isolated plant in Buffalo, N. Y.

Johannesburg

Municipal Electricity Supply at Johannesburg (67924 A). R. Turnbull Mawdesley. Ills. 2000 w. El R—Jan. 21, 1916. Serial, 1st part. History of present system.

London

New Plant at the Stepney Electricity Works (65640 A). Ills. 3500 w. Engr, Lond—Oct. 22, 1915. Improvements and extensions at this London station.

Manila

Electric Service in the "Pearl of the Orient" (68395). Ills. 1200 w. El W—Feb. 26, 1916. Governing factors.

Consult Classification of the Index. See page 7.

Manitoba

GENERATING STATIONS

Power Factor

Manitoba

Water Power Possibilities of the Winnipeg River in Manitoba (72412). Ills. 500 w. E & C—Aug. 9, 1916. Information from a recent report.

Meters

La tarification de l'électricité (65493 B). Ernest Coustet. Ills. 3000 w. Rv Gn Sc—Oct. 30, 1915. Methods of selling electricity and instruments therefor.

Moscow

La station centrale d'électricité (65494 B). J. Vichniak. Ills. 2500 w. Gn Cv—Nov. 6, 1915. General description of central station in Moscow.

Municipal Plants

Regina Municipal Power Plant (66168). A. G. Christie. Ills. 4000 w. Pwr—Dec. 7, 1915. Novel features.

Municipal Power Plant at Medicine Hat (67649). A. G. Christie. Ills. 2500 w. Pwr—Feb. 1, 1916. Electric and pumping; natural-gas-fired boilers.

Municipal Electrical Utilities of Western Canada. (68744). A. G. Christie. 5000 w. Pwr—March 14, 1916. Factors contributing to success.

Calgary's Municipal Power Plant. (68740). A. G. Christie. Ills. 3000 w. Pwr—March 14, 1916. Serial, 1st part. A 13775-Kv.-a. plant held as reserve.

Danville (Va.) Municipal Lighting Plant (69859). Ills. 2000 w. Pwr—April 25, 1916. Details of profitable plant.

Lethbridge Municipal Power Plant (69289). A. G. Christie. Ills. 2500 w. Pwr—April 4, 1916. Near coal mine, in Alberta.

Municipal Power Plant Operated by Saskatoon, Canada (70007). A. G. Christie. Ills. 2500 w. Pwr—May 2, 1916.

Discussion on "The Municipally-Operated Electrical Utilities of Western Canada" (Christie), New York, Feb. 8, 1916 (70427 D). 4500 w. A I E E, Pro—May, 1916.

New South Wales

Power Requirements and Resources of New South Wales (72069 A). William Corin. Abstract of paper before Elec. Assn. of Aust. 2500 w. Eln—July 14, 1916. Serial, 1st part. Present power; resources available; their development.

North Dakota

Federal Power Development at Williston (6251). A. P. Connor. Ills. 2000 w. Pwr—Feb. 22, 1916. Lignite fuel plant furnishes power to irrigation pumps on barges.

Nova Scotia

Water Power Possibilities of Nova Scotia (72699). K. H. Smith. Ills. 2000 w.

Cn E—Aug. 24, 1916. Outline of features bearing on water power development.

Niagara Falls

See same heading under INDUSTRIAL MANAGEMENT, *Miscellany*.

Office Buildings

Power for Ft. Dearborn National Building (69478). Ills. 1000 w. P E, C—April 15, 1916. High-pressure steam purchased for running generators and pumps.

Oil-Engine Plant

Operation of a Small Town Generating Station (69940). Ills. 1300 w. El W—April 29, 1916. Automatic features of a 34-kw. oil-engine storage-battery plant.

Oil Switches

Vorschalterwiderstände und Reaktanzen als Schutz für Oelschalter (70188 B). Ills. 27 pp. Schweiz Elektro Ver—April, 1916. Report of commission on the use of series resistances and reactances to protect oil-break switches.

Parallel Operation

Parallel Operation Troubles (67215). H. E. Ford. Diagrams. 900 w. Pwr—Jan. 11, 1916. Means to overcome tendency of turbo-generator to take all the load from reciprocating engine.

Peak Loads

How Oil Burners Help Boilers Over Peak Loads (73917). Ills. 2000 w. El W—Oct. 14, 1916. St. Joseph, Mo.

Plant Equipment

Mechanical Equipment at Point-No-Point (73210). Ills. 7000 w. P E, C—Sept. 15, 1916. Details of coal, water, and steam handling.

Plant Operation

Operation of a Small Ohio Transmission System (69233). Ills. 1500 w. El W—April 1, 1916. Line construction and plant operating methods.

Power

Present Status of Electric Power Generation, Transmission and Distribution. (68609). Percy H. Thomas. Read before 2d Pan.-Am. Cong. 1800 w. El A—March, 1916. Serial, 1st part.

Power Development

Report on Electric Power Development in the United States and Concentration in Its Ownership and Control (68309 N). C. C. Merrill. 3500 w. U S D A Report to Senate—Dec. 18, 1915. Figures on growth and control.

Power Factor

What the Power-Factor Means (66174). A. P. Broadhead. Ills. 1200 w. El A—Dec., 1915. Ways of improving it on a system.

The Effect of the Power Factor on the Cost of Electric Energy. (68622 A).

Consult Classification of the Index. See page 7.

Power Plants

R. Stöppler. Abstract from *Elek. Zeit.* 1500 w. *Eln*—Feb. 18, 1916.

Power Plants

Development of Electric Power Stations (73480 A). P. V. Hunter. 2200 w. *Eln*—Sept. 15, 1916. Consistent, rapid and sound progress in England.

Extension to West Penn. Co.'s Connells-ville Power Plant (73284). Warren O. Rogers. *Ills.* 1800 w. *Pwr*—Sept. 19, 1916. Addition of three large water-tube boilers serving a turbine of 18,000-kw. for lighting and railways.

The Johannesburg Municipal Electric Power Station (73111 A). J. H. Dobson. *Ills.* 2000 w. *El R*—Aug. 25, 1916. Serial, 1st part. Abstract of paper before the S. African Inst. Descriptive.

Twin-City Power Plants (72969). Thomas Wilson. *Ills.* 5000 w. *Pwr*—Sept. 5, 1916. Features of leading plants.

Um-und Neubau der Schalt-und Transformatoranlage des Elektrizitätswerkes Beznau an der Aare (73500 B). *Ills.* 1700 w. Serial, 1st part. *S B*—Aug. 12, 1916. Changes and new transformer installation.

Private Plants

A Private Electrical Plant at Kensington (65788 A). *Ills.* 1800 w. *Engr*, Lond—Nov. 5, 1915. Example of modern private installation.

Protective Apparatus

Experience and Recent Development in Central Station Protective Features (71228 D). N. L. Pollard and J. T. Lawson. *Ills.* 20 pp. *A I E E*, Pro—June, 1916. Interesting devices and schemes.

Providence

Modernizing Narragansett Co.'s South Street Station. (66796). Charles H. Bromley. *Ills.* 3000 w. *Pwr*—Dec. 28, 1915. Reciprocating-engine station converted into turbo-generating plant without interrupting service.

Additions to Rhode Island Power Plant (68042). *Ills.* 2500 w. *El R JI*—Feb. 12, 1916.

Rates

The Multiplex Cost and Rate System (65896 D). 1600 w. *Am Inst Elec Engrs*, Pro—Nov., 1915. Discussion at Portland, Ore., Jan. 5, 1915, of Otto B. Goldman's paper.

Discussion on "Rates and Rate Making," New York, Oct. 8, 1915 (67486 D). 20500 w. *A I E E*, Pro—Jan., 1916. Paul M. Lincoln's paper.

Discussion on "The Best Control of Public Utilities," San Francisco. Cal., Jan. 22, 1915, and "Class Rates for Light and Power Systems or Territories," Deer Park, Md., July 2, 1915 (67485 D). 6500

GENERATING STATIONS

Service

w. *A I E E*, Pro—Jan., 1916. Papers by Frank G. Baum.

Central Station Demand and Diversity Factors (67909). W. T. Ryan. 3000 w. *El A*—Feb., 1916.

The Computation of a Rate (68116 B). H. O. Garman. With discussion. 3000 w. *Ind Eng Soc*—1915. Simple method.

Discussion on "Class Rates for Light and Power Systems or Territories." (Baum), Deer Park, Md., July 2, 1915. (68759 D). 1200 w. *A I E E* Pro—March, 1916. Continued from January.

Sobre el problema de las tarifas (69614 N). H. Broggi. 10 pp. *U N P*, No. 17—October, 1915. Calculus applied to rates.

Proposed Dividend-Type Domestic Service Rate (74175). W. W. Briggs. 4000 w. *El W*—Oct. 28, 1916. Schedule considering cost of service and encouraging use of electricity.

Reconstruction

Building a Power Station Upon One in Service (65325). *Ills.* 1500 w. *Elec Wld*—Oct. 30, 1915. Serial, 1st part. Work at Springfield, O. Station arranged for efficient operation.

Enlarging Important Steam Station Under Load (67503). *Ills.* 3500 w. *El W*—Jan. 22, 1916. Changes in Connells-ville, Pa., station due to growing load.

Records

Substation Records Increase Efficiency (72723). John Leisenring and Harry W. Coe. 2500 w. *El R JI*—Aug. 26, 1916. Method on Illinois Traction System of compiling operating records.

Reports

Notes on Generating Station Reports (72260 N). V. Pickles, with discussion. 12 pp. *S A I E*, Trans—May, 1916.

St. Louis

Carondelet Power Plant (70254). Thomas Wilson. *Ills.* 2500 w. *Pwr*—May 9, 1916. In St. Louis for manufacture of gas and recovery of byproducts.

Saskatchewan

Power Development in Saskatchewan (72307). E. Hanson. 2200 w. *Cn E*—Aug. 3, 1916. Explains conditions and a power development scheme.

Service

Continuity of Service (70711 A). Jas. R. Werth. *Ills.* 2000 w. *G E R*—June, 1916. Preventing interruptions.

The Restoration of Service After a Necessary Interruption (71230 D). F. E. Ricketts. *Ills.* 14 pp. *A I E E*, Pro—June, 1916. How unavoidable interruptions may be reduced to a minimum.

Discussion on "The Restoration of Service After a Necessary Interruption."

Consult Classification of the Index. See page 7.

Shanghai

(Ricketts), Cleveland, Ohio, June 27, 1916 (73369 D). 2500 w. A I E E, Pro—Sept., 1916.

Shanghai

Shanghai Electricity Works (65772 A). Ills. 1600 w. Elec Rev, Lond—Nov. 5, 1915. Serial, 1st part. Detailed description.

Short-Circuits

Mechanical Effects of Electrical Short-Circuits (65357 A). S. H. Weaver. 2500 w. Gen Elec Rev—Nov., 1915. Determining the stress.

Single-Phase Power

Single-Phase Power Production (74109 D). E. F. W. Alexanderson and G. H. Hill. Ills. 4500 w. A I E E, Pro—Oct., 1916. Suggests means for producing single-phase power without interfering with the usefulness of the power station.

Single-Phase Power Service from Central Stations (74108 D). R. E. Gilman and C. Le G. Fortescue. 20 pp. A I E E, Pro—Oct., 1916. Outlines methods of supplying single-phase power from a polyphase system.

The Power Company's Problem in the Electric Supply for Large Single-Phase Load. (74110 D). William C. L. Eglin. 1200 w. A I E E Pro—Oct., 1916. Methods of balancing are discussed.

Small Stations

Small Electric Stations (70523 A). Louis J. Lawless. 2200 w. S M C E—May 5, 1916. Typical plant; financial success.

The Electric Lighting of Small Towns (71634 A). H. N. Munro. Abstract of paper read before Jun. Inst. of Engrs. 3500 w. Eln—June 16, 1916. Requirements. Results of working.

The Generation of Electricity on a Small Scale or Bulk Supply (71708 A). H. S. Ellis. Abstract, with discussion. 4500 w. Eln—June 23, 1916. Capability of small stations to produce electricity cheaply as compared with bulk supply.

The Problem of the Small Generating Station (71631 A). George Wilkinson. Ills. 2000 w. Eln—June 16, 1916. The question of equipment.

See also Electricity, under *Miscellany*.

Storage Batteries

Standby Battery for A. C. Distribution Service (67071). J. Lester Woodbridge. Ills. 2500 w. El W—Jan. 29, 1916. Use in suburban substation.

Storm Detectors

See same heading under *Transmission and Distribution*.

Substations

The Development and Operation of Outdoor Substations (65588). F. L. Hunt. Read before Nat. Assn. of Elec. Insp. 3000 w. Elec Rev & W Elect'n—

GENERATING STATIONS

Switchboards

Nov. 6, 1915. Serial, 1st part. Progress and advantages.

Substation to Serve New York Theater District (65556). Ills. 2500 w. Elec Wld—Nov. 6, 1915. To economize in copper and duct construction.

The Equipment of a Modern Substation (66173). H. G. Davis. Ills. 4000 w. El A—Dec., 1915. Constructional and control features at Columbus, S. C.

Purchased Power for the New Haven (66619). Ills. 2000 w. El R JI—Dec. 18, 1915. Details of new substation at West Farms.

West Farms Substation of New Haven Railroad (66603). Ills. 1500 w. El W—Dec. 18, 1915.

High-tension Outdoor Substations. (68607). Ills. 2500 w. El A—March, 1916. Advantages and costs.

Electric Sub-Station Equipment (70543 A). 3500 w. Mch W—May 12, 1916. Serial, 1st part. Types for different requirements.

Large Accumulator Sub-Station of the Metropolitan Electric Supply Co. (70018 A). Ills. 1500 w. Eln—April 14, 1916. Second largest battery in England.

Installation Costs for Industrial Plant Substations (70959). N. Nesbitt Teague. Ills. 4500 w. El W—June 10, 1916. Construction, operation, cost, &c.

A 3000 to 5700-Kva. Substation Built at Low Cost (72316). L. J. McKenzie. Ills. 1000 w. El W—Aug. 5, 1916. Arrangement for outdoor equipment. Provisions for operating transformers at double rating.

Supply

Chemical Electricity Supply (71193 B). Samuel Insull. 3000 w. E S W P, Pro—April, 1916. Benefits and economy.

Sweden

Les Barrages et l'Usine Hydro-Electrique d'Aelfkarleby (74222 B). Ills. 2800 w. Gn Cv—Sept. 23, 1916. Description of hydro-electric plant in Sweden recently completed.

Switchboards

Electrically - Operated Switchboards (65347). H. A. Travers. Ills. 4000 w. Elec Jour—Nov., 1915. Component parts of the control equipment.

Modern Switchboard Practice (70692 A). John W. Upp. Ills. 1500 w. G E R—June, 1916. Modern development.

Switchboards for Polyphase Testing (73112 A). A. T. Bullen. Diagrams. 800 w. El R—Sept. 1, 1916. Explains a simple arrangement of switches whereby the current in any phase of a three-phase system can be measured on a single instrument without changing connections.

Switchgear

Safety First Switchboard Devices (73595 A). B. Parks Rucker. Ills. 3000 w. G E R—Oct., 1916. Electric control devices.

Switchgear

Switchgear for Central Stations and Isolated Plants (71711 A). Ills. 3000 w. Eln—June 23, 1916. Design and selection. Principles and practical details described.

Switching

The Design of Power-Station and Substation Bus Structures (67304). Ills. 1200 w. El W—Jan. 15, 1916. Laying out and installing switching apparatus.

Switzerland

Die Kraftwerke der Schweiz, Bundesbahnen am Gotthard (72798 B). 1600 w. S B—July 22, 1916. Serial, 1st part. Description of new electric power installation for Swiss Federal railways.

Syracuse, N. Y.

Power System of the Syracuse Lighting Co. (72023). Norman G. Meade. Ills. 2500 w. Pwr—July 25, 1916. One main generating station and several substations, operated in conjunction with purchased power.

Tasmania

Tasmanian Water Power (72740 N). Hartwell Conder. Map. 1500 w. A M S

GENERATORS AND MOTORS

Armatures

—July 13 1916. Hydro-electric work in Tasmania.

Tramway Stations

Het nieuwe elektrische station met éénankerdraairom - gelijkstroom - omzeters aan de Leidsche Vaart te Haarlem, van de Electriche Spoorweg-Maatschappij. (68834 B). Ills. 2500 w. Ing—Feb. 19, 1916. Description of new generating station for tramway in Haarlem.

Vladivostok

L'Usine Génératrice D'Énergie Electrique De Vladivostok (72804 B). Charts. 2400 w. I El—June 10, 1916. Description of a recently completed power station at Vladivostok.

Western Canada

The Municipally-Operated Electrical Utilities of Western Canada (67690 D). A. G. Christie. 17500 w. A I E E, Pro—Feb., 1916. Equipment.

Wheeling, W. Va.

Power Station Improvements at Wheeling, W. Va. (66622). J. M. Hopwood. Ills. 2500 w. El T—Dec., 1915. Details of large plant.

West Penn Traction Co.'s Wheeling Power Plant (66428). W. E. Moore. Ills. 2500 w. Pwr—Dec. 14, 1915.

GENERATORS AND MOTORS

A. C. Generators

De synchrone tegen-en dwarsveldreactantie van één-en meerfasen wisselstroom-generatoren (73503 B). Ills. 4500 w. Serial, 1st part. Ing—Aug. 26, 1916. Synchronism of cross-field reaction in alternating generators. Mathematical treatment.

A. C. Motors

Alternating-Current Motors (69839). Justin Lebovici. Diagrams. 3000 w. El R & W E—April 22, 1916. Serial, 1st part. Fundamental principles.

Alternators

Discussion on "Calculation of Sudden Short-Circuit Phenomena of Alternators" (Diamant), San Francisco, Cal., Sept. 17, 1915 (69525 D). Ills. 2000 w. A I E E, Pro—April, 1916.

Short-Circuit Current of Alternators (69986). F. T. Hague. 1000 w. El JI—May, 1916. Explanation of current decrease.

Discussion on "Classification of Alternating-Current Motors" (Flynn), and "The Classification of Electromagnetic Machinery" (Creedy), Deer Park, Md., June 30, 1915 (70429 D). 4000 w. A I E E, Pro—May, 1916.

Alternators

Alternating-Current Motors (71408 A). H. C. E. Jacoby. 4500 w. Mch E—June 16, 1916. Unusual types, with remarks on speed control.

Alternating - Current - Motor Windings (71126). Justin Lebovici. Ills. 1500 w. El R & W E—June 17, 1916. Serial, 1st part. Deals with single-phase windings in present article.

Third Harmonics in the Phase Pressure of Three-Phase Alternators with Cylindrical Rotors (70843 A). A. E. Clayton. 1200 w. Eln—May 19, 1916. Effect of the angle of spread upon the magnitude of the third harmonics.

Turbine-Driven Alternators (71630 A). Ills. 1800 w. Eln—June 16, 1916. Particulars of the British Thomson-Houston alternators.

Armatures

A Comparison of Motor Armatures of Different Diameters (66312). F. A. Rew. 1200 w. El JI—Dec., 1915. Design.

Methods of Chord Winding for Continuous Current Armatures. (69012 A). F. Leyerer. Abstract from *Elektro Zeit.* Ills. 1200 w. Eln—March 3, 1916. Details of methods.

Consult Classification of the Index. See page 7.

Balance

GENERATORS AND MOTORS

Converters

Direct-Current Armature-Winding Troubles (70362). T. Schutter. Ills. 1800 w. El R & W E—May 13, 1916.

Types of Armature Windings for Direct-Current Machines (71487). Norman G. Meade. Ills. 1200 w. N E—July, 1916. Reasons for the various windings.

Direct-Current Armature Windings (73122). John A. Randolph. Ills. 2000 w. Pwr—Sept. 12, 1916. Types, and the process of commutation.

Hot Spots in Synchronous Converter Armatures (74067). Alfred E. Hanson and Chester A. Corney. Ills. 1000 w. El W—Oct. 21, 1916. Results of experimental investigation of the temperature distribution.

Balance

The Dynamic Balance of Machines (71499 A). Charles L. Clarke. 2200 w. G E R—July, 1916. From the consulting engineering department of the General Electric Co. Methods used.

Ball Bearings

Ball Bearings for Electric Motors (69574 A). Ills. 1000 w. El R—March 31, 1916. Mode of mounting.

Brushes

Brushes for Commutators and Slip Rings (70648). Charles H. Smith. 10500 w. El JI—June, 1916. Their selection, application and care.

Carbon Brushes

Discussion on "Some Troubles Encountered in the Operation of Carbon Brushes on Direct-Current Generators and Motors" (Martindale), Cleveland, Ohio, March 19, 1915 (66665 D) 4500 w. A I E E—Dec., 1915.

Commutation

Discussion on Physical Limitations in D-C. Commutating Machinery, San Francisco, Cal., Sept. 16, 1915 (67684 D). 22000 w. A I E E, Pro—Feb., 1916. Lamme's paper.

Commutation of Direct-Current Motors (72492). Norman G. Meade. Ills. 700 w. El A—Aug., 1916. Explanatory notes.

Effect of Brush Width on Commutation (72194). C. G. Lewis. 1800 w. El JI—Aug., 1916. Large influence on the operation of d. c. machines.

Commutators

Berechnung und Bauart von Kommutatoren für hohe Geschwindigkeiten (65443 B). Ills. 1800 w. Ply Rnd—Oct. 17, 1915. Method of calculating and building commutators for high-speed machines.

Commutator Operation (69983). Gordon Fox. Ills. 3500 w. N E—May, 1916. Serial, 1st part. Function; troubles and remedies.

The Determination of the Dimensions of Commutators (71000 A). Thomas

Carter. 4500 w. Eln—May 26, 1916. Develops formula which denotes watts lost in friction and brush contact drop. Theoretical treatment.

The Connection of Armature Coils to Commutator Segments (73290 A). Rudolf Knoll. Ills. 600 w. Eln—Sept. 8, 1916. Explains the use of a simple formula for finding the required segment on the commutator.

Compensated Generator

The Compensated Generator (73211). Ills. 1500 w. P E, C—Sept. 15, 1916. General characteristics and adaptability of this type.

Control

The Principles and Systems of Electric Motor Control (66661 D). C. D. Knight. Ills. 3500 w. A I E E—Dec., 1915. Types of resistance, forms of magnetic control.

Discussion on "The Principles and Systems of Electric Motor Control" (Knight), New York, Dec. 10, 1915 (70425 D). 5500 w. A I E E, Pro—May, 1916.

Industrial Control (71496 A). Ills. The Economic Control of the Electrical Apparatus Used in the Rubber Industry. Harris E. Dexter. 4500 w. G E R—July, 1916. Serial, 1st part. First of a series on various forms of control apparatus used in different industries.

Control Gear for Direct-Current Motors (71706 A). E. F. Butler. Ills. 2000 w. El R—June 23, 1916. Serial, 1st part. Types that may often be used with advantage.

Controllers

Alternating-Current Controllers for Steel Mills (Simon); The Alternating Current Coal Hoist (Brown) (65903 D). 20 pp. Am Inst Elec Engrs, Pro—Nov., 1915. Two papers discussed together at Pittsburgh, Pa., April 16, 1915.

Mill Controllers (Stratton), and Steel Mill Controllers from the Operator's Standpoint (Riggs) (65902 D). 26 pp. Am Inst Elec Engrs, Pro—Nov., 1915. Two papers discussed together at Pittsburgh, Pa., April 15, 1915.

Hoisting Controllers for Large Electric Revolving Cantilever Cranes (69576 A). Ills. 800 w. Eln—March 24, 1916.

Important adjuncts to a crane installation.

Practical Talks on Controllers—Reversing Switches (73458). A. A. Fredericks. Ills. 800 w. Pwr—Sept. 26, 1916. Serial, 1st part. On controllers for electric motors. This article deals with types of reversing switches in use.

Converters

Synchronous Converters and Motor-Generator Sets (70696 A). J. L. Burn-

Design

GENERATORS AND MOTORS

Induction Generator

ham. Ills. 1800 w. G E R—June, 1916. Compares these machines and explains functions of each.

Principles of Phase Converter (71165). Diagrams & Ills. 1200 w. Pwr—June 20, 1916. Not essentially different from the induction motor.

The Split-Pole Rotary Converter (72493). William R. Bowker. Ills. 1000 w. El A—Aug., 1916. Principle of operation.

Synchronous Converters (73940). F. A. Annett and Gordon Fox. Ills. 2500 w. Pwr—Oct. 17, 1916. Serial, 1st part. First of three articles on rotary converters. Explains purpose of machine, different ways of using, operation, etc.

Design

The Predetermination of the Performance of Dynamo-Electric Machinery (68098 N). Miles Walker. Ills. 2500 w. I E E, JI—Feb. 1, 1916. Design, with discussion.

The Predetermination of the Performance of Dynamo-Electric Machinery (68846 N). 14 pp. I E E, JI—Feb. 15, 1916. Discussion of Walker's paper.

Discussion on The Predetermination of the Performance of Dynamo-Electric Machinery. (68789 N). 3500 w. I E E, JI—March 1, 1916. Continued discussion of Walker's paper.

D. C. Generators

Direct - Current 3 - Wire Machines (69190). Gordon Fox. 3000 w. P E, C—April 1, 1916. Application, construction, operation.

D. C. Machines

Operating Direct-Current Generators in Parallel (71413). H. G. Gibson. Ills. 1500 w. Pwr—June 27, 1916. Explanation of switchboard connections.

The Compensated Generator (72195). David Hall. Ills. 1800 w. El JI—Aug., 1916. Distinguishing features and benefits.

Output Limitations in Direct-Current Machines (74068). Alex Gray. 700 w. El W—Oct. 21, 1916. Analysis of design to determine economy of higher speeds for a given output in steel rolling mill motors.

D. C. Motors

Adapting Direct-Current Motors to Changed Conditions (69266). H. L. Smith. 4000 w. El JI—April, 1916. General theory and applications.

Electrical Machinery

Ventilating Electric Machines (72472). Gordon Fox. Ills. 2000 w. Pwr—Aug. 15, 1916. Cause of heating and methods of ventilation.

Dynamo-Electric Machinery, 1878-1916 (73473 A). Miles Walker. Ills. 3300 w. El n—Sept. 15, 1916. Progress from early

beginnings, changes in design, output, cost, etc.

Heating and Ventilation of Electrical Machinery (74074 A). Alexander Gray. Ills. 3500 w. S JI E—Oct., 1916. Fundamental principles of heat dissipation.

Elevator Motors

Characteristics of the High Resistance Rotor, Squirrel-Cage Motor for Elevator Service and a Comparison with the Phase-Wound Rotor Machine (66976 A). R. H. McLain. 3300 w. G E R—Jan., 1916. Better driving unit for certain types.

Exciters

Alternator Excitation and Exciter (72184). Gordon Fox. Ills. 2500 w. Pwr—Aug. 1, 1916. Methods of excitation, current practice, etc.

Flashing

Ring Fire and Flashing. (69157). Gordon Fox. Ills. 2500 w. Pwr—March 28, 1916. Difference, causes and means of prevention.

Generators

Notes on Waterwheel Driven Generators (70694 A). H. G. Reist. Ills. 1200 w. G E R—June, 1916. Design.

Test of Large Hydro-Electric Generators (70697 A). R. Treat. Diagram. 4500 w. G E R—June, 1916. Methods.

Heating

Graphisches Verfahren zur Vorausbestimmung der Erwärmung von Bahnmotoren (66210). H. Engel. Ills. 2000 w. E K u B—Nov. 14, 1915. Graphic calculations to determine heating to be expected in railway motors.

High-Speed Generators

Some Difficulties of Design of High-Speed Generators (66439 N). A. B. Field. Ills. 8000 w. I E E JI—1915. Specific examples.

Discussion on "Some Difficulties of Design of High-Speed Generators" (68101 N). 8500 w. I E E, JI—Feb. 1, 1916. A. B. Field's paper discussed at Yorkshire local section, Dec. 8, 1915.

Illuminating Engineering

Some Factors in Illuminating Engineering (65693 A). F. K. Richtmyer. 2500 w. Sib Jour of Engng—Nov., 1915. Serial, 1st part. First of a series of articles discusses the development.

Incandescent Lamps

Vergleichende photometrische Untersuchungen an Glühlampen (65405 B). K. Zickler. Ills. 3000 w. E u M—Sept. 26, 1915. Serial, 1st part. Photometric investigation of relative efficiency of certain types of incandescent lamps.

Induction Generator

The Induction Generator (72745). H. M. Phillips. 1500 w. Pwr—Aug. 29,

Induction Motors

1916. Fundamental principles, applications and limitations.

Induction Motors

Induction Motors (67279). Ills. 1500 w. P E C—Jan. 15, 1916. General construction; details.

Reconnecting Induction Motors (76267). A. M. Dudley. Diagrams. 11500 w. El JI—Feb., 1916. Changing motor characteristics, and means.

Discussion on "The Repulsion-Start Induction Motor" (Hamilton), St. Louis, Mo., Oct. 19, 1915 (69526 D). Ills. 2000 w. A I E E, Pro—April, 1916.

Induction-Motor Characteristics (70396). H. M. Phillips. 2500 w. Pwr—May 16, 1916.

Adjustable Speed Induction Motors (71733 A). Ills. 1200 w. Enr—June 23, 1916. New motor invented by F. Creedy, capable of running at a number of speeds and working economically under all conditions.

Adjustable-Speed Polyphase Induction Motors (72149 A). Ills. 2500 w. El R—July 14, 1916. A new type of variable-pole machine.

Use of Metal Slot Wedges in Induction Motors with Special Reference to Their Effect on Performance (72992). Blaine B. Ramey. Ills. 3000 w. El JI—Sept., 1916. Effect of different types of wedging and slot construction.

Discussion on "Effect of Barometric Pressure on Temperature Rise of Self-Cooled Stationary Induction Apparatus" (Montsinger). Cleveland, Ohio, June 27, 1916. (74112 D). 1700 w. A I E E, Pro—Oct., 1916.

Enclosed Induction Motors (72198). O. C. Schoenfeld. Ills. 2500 w. El JI—Aug., 1916. Types and their installation.

Emploi Des Moteurs Triphases A Induction sur les Réseaux A Courant Alternatif Simple (72791 B). Ills. 1000 w. I El—July 25, 1916. Discussion of action of a 3-phase induction motor on single-phase circuits. Simple mathematical treatment.

Rewinding Induction Motors (72346). G. Sabonjian. Ills. 1000 w. Pwr—Aug. 8, 1916. Suggests using a concentric distributed winding in place of a uniformly distributed winding for motors up to 5 h. p.

The Air-Gap Field of the Polyphase Induction Motor (72751 A). F. T. Chapman. Ills. 2000 w. Eln—Aug. 18, 1916. Serial, 1st part. Investigates the effects of the reaction of rotor currents and the saturation of magnetic circuit, on the distribution of the field in the air gap.

Insulation

Notes on Industrial Motor Insulation (66310). J. L. Rylander. 2000 w. El

GENERATORS AND MOTORS**Motor Applications**

JI—Dec., 1915. Points requiring attention.

Discussion on "Experimental Data Concerning the Safe Operating Temperature for Mica Armature-Coil Insulation," New York, Nov. 12, 1915 (67689 D). 6000 w. A I E E, Pro—Feb., 1916. Newbury's paper.

Interpole Machines

Operation of Interpole Direct-Current Machines. (68715). Justin Lebovici. 1500 w. El W—March 11, 1916. Serial, 1st part. Methods for adjustments in present article.

Iron Losses

Iron Losses in Direct-Current Machines. (68757 D). B. G. Lamme. 9000 w. A I E E, Pro—March, 1916. Causes.

Discussion on "Iron Losses in Direct-Current Machines" (Lamme), Schenectady, N. Y., March 7, 1916 (71919 D). 13 pp. A I E E, Pro—July, 1916.

Lighting Code

A Code for Better Industrial Lighting (65865). C. E. Clewell. Ills. 2200 w. Elec Wld—Nov. 20, 1915. Review of the Code of Lighting recently issued by the Illuminating Engineering Society.

Losses

Pole-Face Losses (67390 N). F. W. Carter. Ills. 1000 w. I E E—Jan., 1915. Calculations of Eddy-current loss in pole-shoes of dynamo-electric machines. Die sogenannte zusätzliche Streuung bei Mehrphasen-Kommutatormaschinen und der Heylendsche Drehstrom-Repulsionsmotor (69660 B). Robert Moser. Ills. 4500 w. E u M—March 26, 1916. Serial, 1st part. Questions of additional losses with multiple-phase commutator motors and the Heyland three-phase repulsion motor.

Losses in Continuous-Current Motors and Generators (70009). A. M. Bennett. 3000 w. Pwr—May 2, 1916.

Magnetic Flux

Distribution of Magnetic Flux in Commutating Zone of Direct-Current Machines (69866 A). Cl. Shenfer. Ills. 2000 w. Eln—April 7, 1916. Conclusions.

Mine Motors

Explosion-Proof Motors Operating in Mines (71498 A). C. W. Larson. Ills. 700 w. G E R—July, 1916. Safety features and test results.

Motor Applications

The Electric Motor as an Economic Factor in Industrial Life (66974 A). David B. Rushmore. 5000 w. G E R—Jan., 1916. Applications, types, characteristics.

Consult Classification of the Index. See page 7.

Motor Classification

GENERATORS AND MOTORS

Railway Motors

Motor Classification

Classification and Nomenclature of Electric Motors (69265). R. E. Hellmund. 8000 w. El JI—April, 1916.

Motor Design

Das Kreisdiagramm für den mehrphasigen Nebenschluss-Kommutatormotor (68301 B). H. Kafka. Ills. 2500 w. E u M—Jan. 23, 1916. Serial, 1st part. Mathematical analysis of circle diagram for multiphase commutator shunt motor.

Motor Generators

Motor Generators (69979). Norman G. Meade. Ills. 1000 w. N E—May, 1916. Types and applications.

Motor Hire

Hire and Maintenance of Continuous-Current Motors (70437 N). Henry Joseph, with discussion. 155 pp. I E E, JI—May 1, 1916. Particulars of rather unusual business.

Motor Installation

Installation von Elektromotoren (66256 B). E. Adler. 3500 w. E u M—Nov. 28, 1915. Fields of different types of motors with hints as to installation.

Motor Maintenance

Direct-Current Motor Maintenance (67323 A). S. Lees. Ills. 2200 w. El R—Dec. 31, 1915. Serial, 1st part. Cleanliness; insulation troubles and other causes of failure.

Cost of Motor Repairs (66902). George A. Schneider. 1500 w. El R & W E—Jan. 1, 1916. Details of work.

Motor Size

Analytical Determination of Mean Effective Current (68978). W. D. Peaslee. 500 w. El W—March 18, 1916. Calculating size of motor and feeder.

Motor Tests

Interpretation of Test Data (72196). C. A. M. Weber. 1700 w. El JI—Aug., 1916. Accurate method of obtaining the characteristics of a single-phase squirrel-cage induction motor.

Nomenclature

Nomenclature of A-C. Commutator Motors (71923 D). 800 w. A I E E, Pro—July, 1916. Report of Sub-Committee of the Standards Committee, April 8, 1916.

Oils

Oil Leakage (70402). Gordon Fox. 2000 w. P E, C—May 15, 1916. Injurious effects of lubricating oils on commutators and armatures.

Parallel Operation

Parallel Operation of Direct-Current Generators (68445). Alan M. Bennett. 2500 w. Pwr—Feb. 29, 1916. Properties of various types.

Running D.C. Generators in Parallel. (68707 N). G. Graham. 2500 w. Civ E—Feb. 1, 1916. Keeping generators at

the same degree of compounding on varying loads.

Faulty Parallel Operation of Motor Generators (72454). N. P. Hoisington. 900 w. El W—Aug. 12, 1916. How the cause of trouble was located and remedy ascertained.

Phase Compensators

Die Vorausberechnung der Phasen-Kompensatoren (72796 B). J. Fischer-Hinnen. Ills. 3800 w. S E V, Bul—July, 1916. Mathematical expressions deduced for calculating the proportions of phase compensators for any characteristics. Description and dimensions of recent machines.

Polyphase Motors

The Brush-Shifting Polyphase Series Motor (67635 A). W. C. K. Altes. Diagrams. 5500 w. G E R—Feb., 1916. Serial, 1st part. This number deals with theory of both single-phase and polyphase.

Poulsen-Arc

Some Characteristic Curves of a Poulsen-Arc Generator (73490 A). N. W. McLachlan. 1800 w. Eln—Sept. 15, 1916. Serial, 1st part. Investigations and computations.

Protection

The Protection of Compound Wound Generators Working in Parallel (70839 N). 1200 w. Cw E—May 1, 1916. Ample protection obtained by using one single pole overload and one reverse current circuit breaker. Theory discussed.

Power Factor

Synchronous Motors for Power-Factor Corrections (65866). Th. Schou. Curves. 3000 w. Elec Wld—Nov. 20, 1915. Effects of low power-factor, and benefits of synchronous condensers and motors.

Le Facteur De Puissance Des Moteurs Polyphases A Vitesse Lente (72803 B). Ills. 1600 w. I El—June 10, 1916. Discussion of the effect of change in value of power factor on slow-speed polyphase motors.

Power Input

Electric Power Input for Railroad Bridges Movable in a Vertical Plane (72839 N). Burton R. Leffler. 2000 w. A R E A, Bul—July 1916. Results of experiments.

Railway Motors

Luftgekühlte Strassenbahnmotoren der AEG (66211 B). Leonhard Adler. Ills. 2800 w. E K u B—Nov 14, 1915. Methods of air cooling on AEG street-car motors.

Continuous-Current Railway Motors (69841 N). Ernest V. Pannell, with discussion. Ills. 21500 w. I E E, JI—April 1, 1916. Requirements, service, tendencies in design.

Consult Classification of the Index. See page 7.

Reversible Motors

Mechanical Considerations in the Design of Railway Motors (69984). R. E. Hellmund. Ills. 5000 w. El JI—May, 1916.

Discussion on "Continuous-Current Railway Motors" (71850 N). 2000 w. I E E, JI—June, 1916. E. V. Pannel's paper.

Some Features of Commutating-Pole Railway Motor Construction (72997). F. W. McCloskey. Ills. 2000 w. El JI—Sept., 1916. Important design features of street car motors.

Reversible Mills

Electric Drive for Reversing Mills (72917). Wilfred Sykes and David Hall. Ills. 3000 w. I T R—Aug. 31, 1916. Development of the reversible motor to meet severe conditions.

Regenerative Control

Regenerative Braking with Polyphase Induction Motors (72193). H. G. Jungk. 1500 w. El JI—Aug., 1916. Method explained. Same system as used on Norfolk & Western electric locomotives.

Regulation

The Regulation of Direct-Current Generators. (68743). H. M. Phillips. 3000 w. Pwr—March 14, 1916. Behavior under test; what should be specified.

Residences

The Illumination of the Suburban Home (65507 B). Harold L. Alt. Ills. 4000 w. Br Build—Oct., 1915. Electricity or acetylene.

Reversing

Reversing a Three-Phase Motor (67630). C. W. Kincaid. Diagrams. 600 w. El JI—Feb., 1916. General explanation.

Rotary Converters

The Starting of Rotary Converters (66069 A). W. Linke. Abstract from *Elektro Zeit.* 2500 w. Eln—Nov. 19, 1915. Methods in practical working of rotaries.

Armature Copper Losses in Rotary Converters and Double-Current Generators (66444 N). Laurence H. A. Carr. 1500 w. I E E—Nov. 29, 1915. Calculations.

Rotary Converters (70108 A). F. P. Whitaker. Ills. 4500 w. Beama JI—April, 1916. General.

A Rotary Converter Installation (70516 A). E. P. Austin. 1100 w. El R—May 5, 1916. Method of linking two generating systems of different periodicities.

Shunt Motors

Why Weakening the Field of a Shunt Motor Will Increase Its Speed (71039 B). Thornton A. Lemaster. 600 w. U S A JI—May-June, 1916. Shows how increase in torque is accomplished by weakening the field.

GENERATORS AND MOTORS

Synchronous Alternators

Single Phase

Single-Phase Alternating Current Motors (71491 A). W. C. K. Altes and N. Currie, Jr. Ills. 2200 w. G E R—July, 1916. Interesting features.

Single-Phase Commutator Motors. (68438). R. E. Hellmund and J. V. Dobson. Diagrams. 5000 w. El JI—March, 1916. Serial 1st part. Present article gives outline of these motors.

Characteristics of Three-Phase Induction Motors on Single Phase Circuits. (68621 A). M. Rosenbaum. Ills. 2000 w. Eln—Feb. 18, 1916. Method of employing.

Small Motors

Fractional Horse Power Motor Load (65894 D). 1000 w. Am Inst Elec Engrs, Pro—Nov., 1915. Discussion at Cleveland, Ohio, March 19, 1915, of Bernard Lester's paper.

Speed Regulation

Speed Regulation of Adjustable Speed Motors (72996). H. L. Smith. Ills. 1800 w. El JI—Sept., 1916. Conditions and their effects.

Stairways

Das Breslauer System der elektrischen Treppenbeleuchtungen (65406 B). Arthur v. Altkier. Ills. 2500 w. E u M—Oct. 3, 1915. Details of method adopted for staircase lighting in Breslau.

Standardization

Le Norme Dell'a E. I. per l'Ordinazione e il Collaudo delle Machine Elettriche (74209 B). Serial, 1st part. 2400 w. M T—Aug. 30, 1916. Discussion of standardization of electric machinery.

Starters

Apparatus for Starting and Controlling Electrical Running Machinery. (69013 A). C. C. Garrard. 2500 w. Eln—March 3, 1916. Serial, 1st part. Using variable resistances.

Streets

Parallel vs. Staggered Arrangement of Lamps (65557). H. E. Butler. Ills. 600 w. Elec Wld—Nov. 6, 1915. Merits of the two systems.

Surges

A Study of the Surges Caused on Switching Off Asynchronous Motors (67326 A). Reinhold Rudenberg. Abstract from *Elektro. Zeit.* 1000 w. Eln—Dec. 31, 1915. Cause and remedy.

Switchgear

A Plea for the Standardization of Switchgear (70447 A). J. P. C. Kivlen. 3300 w. I & C T R—April 28, 1916. Read before W. of Scotland Br. of Assn. of Min. Elec. Engrs.

Synchronous Alternators

The Excitation of Synchronous Machines (68045). Theo Schou. Curves. 1800 w. El W—Feb. 12, 1916. Serial,

Synchronous Motors ..

1st part. Operating characteristics of alternator.

Synchronous Motors

Uses and Starting of Synchronous Motors (69417). Harold Mann. 2000 w. El A—April, 1916. How they may replace induction motors.

Some Features of Synchronous Motor Design (70695 A). W. J. Foster. Ills. 3500 w. G E R—June, 1916. Characteristics; construction and operation.

Three-Phase Generators

Three-Phase Generators for the Rjukanfos Power Station (66680 A). Ills. 2000 w. El n—Dec. 10, 1915. Largest built for direct coupling to water-turbines.

Three-Phase Generators for Rjukan II. Power Station at Saaheim, Norway (69880 A). Ills. 2500 w. Eng—April 14, 1916. Details of largest yet built for water-turbines.

Torque

Torque Characteristics of Direct-Current Motors (66038). Alan M. Bennett. Ills. 3800 w. Power—Nov. 30, 1915. What the torque of a motor is, how it is determined, and how it varies in shunt, compound, and series motors.

Tractive Effort

Factors Causing Variable Tractive Effort of Electric Motors (69411 A). A. J. Mansen. 1000 w. R M M—April, 1916. Differences between steam and electric motors.

Turbo-Generator

1250 Kilowatt D. C. Turbo-Generator (67341 A). Ills. 1500 w. Enr—Dec. 31, 1915. Recent addition to power plant of chemical works at Middlewich.

ILLUMINATION**Army Lighting**

1500-KW. Geared Turbo-Generator at the Westinghouse Works, Trafford Park, Manchester (73297 A). Plate. 1800 w. Eng—Sept. 8, 1916. Serial, 1st part. Details of new plant installed.

The Mechanical Design of Turbo-Generators (73941). William Knight. 4000 w. Pwr—Oct. 17, 1916. Mechanical problems involved.

See also Air Washing, under **MECHANICAL ENGINEERING, Heating and Cooling.**

Ventilation

Ventilation as a Factor in the Economical Design of Electrical Machinery (70015 A). Edgar Knowlton. 2500 w. G E R—May, 1916. Serial, 1st part. Reduction of cost.

Some Practical Considerations in Artificial Ventilation of Electrical Machinery (70646). B. G. Lamme. 2000 w. El JI—June, 1916. Conditions that have given trouble.

Voltage

Building Up the Voltage (70555). Gordon Fox. 1200 w. Pwr—May 23, 1916. Causes of failure and reversed polarity analyzed.

The Effects of Power Factor on Voltage Regulation (71859). F. A. Annett. Ills. 1500 w. Pwr—July 18, 1916. Voltage regulation of a. c. generators as affected by inductance and capacity of the load.

Windings

Polyphase Motor Windings (72404). Justin Lebovici. Ills. 2000 w. El R & W E—Aug. 5, 1916. Serial, 1st part. Windings of different types are considered.

See also Electric Machinery under **MECHANICAL ENGINEERING, Machine Works and Foundries.**

ILLUMINATION**Absorption**

Light Transmission through Telescopes (69628 C). F. Kollmorgen. Ills. 15 pp. I E S Trans—March 20, 1916. Method of glass treatment to reduce absorption; with discussion.

Animal Light

The Production of Light by Animals (65830 B). Ulric Dahlgren. Ills. 8500 w. Fr Inst, Jour—Nov., 1915. Serial, 1st part. A study of the light producing power and the principles governing the process.

Arc Lamps

Die Regelung der Gleichstrombogenlampen in analytischgraphischer Behandlung (67743 B). Josef Kuhn. Ills. 1500 w. E u M—Jan. 9, 1916. Serial, 1st part. Arc-lamp regulation treated both graphically and analytically.

Army Lighting

Lighting in the Army (74037 C). Edward D. Ardery, with discussion. 3300 w. I E S, Trans—Oct. 10, 1916. Outline factors which govern the selection of illuminants for camp life or battle manoeuvres, and other needs.

Consult Classification of the Index. See page 7.

Artificial Day Light**Artificial Day Light**

"Daylite Glass" (70033 A). Henry Phelps Gage. Ills. 2000 w. S JI E—May, 1916. Production and uses.

Artificial Lighting

Artificial Lighting and Shop Production (71555). D. R. Shearer. 1500 w. El R & W E—July 1, 1916. Requirements of shop lighting in various lines of manufacture.

Automobile Headlights

See Headlights under MECHANICAL ENGINEERING. *Automobiles*.

Automobile Lighting

See Lighting under MECHANICAL ENGINEERING. *Automobiles*.

Candlepower

The Candle-Power and Beam of a Paraffine Lamp (66626 A). D. H. Ogle. Ills. 1800 w. Acr—Dec. 4, 1915. Serial, 1st part. Results of experiments and measurements.

The Nominal Candle-Power of Incandescent Lamps. (68796 A). Ernst Salomon. Abstract from *Elek. Zeit.* 1500 w. Eln—Feb. 25, 1916. Methods of rating in use.

Candlepower Measurements of Series Gas-Filled Incandescent Lamps (69626 C). Ralph C. Robinson. Ills. 5 pp. I E S Trans—Mar. 20, 1916. Methods and results; with discussion.

Churches

Lighting a Church Auditorium Without Fixtures (68396). A. L. Powell and R. B. Thompson. Ills. 1500 w. El W—Feb. 26, 1916. St. George's Episcopal Church, Newburgh, N. Y.

Lighting a Church of the Basilica Type (73778). Ills. 1200 w. El R & W E—Sept. 30, 1916. Combination of direct and indirect lighting.

Color Mixture

The Transformation of Color-Mixture Equations from One System to Another (66519 B). Herbert E. Ives. 6500 w. F I—Dec., 1915. Data.

Commercial Lighting

The Selection of a Standard Unit for Commercial Lighting (74038 C). Walter R. Moulton, with discussion. Ills. 4800 w. I E S Trans—Oct., 1916. Shows a decision was reached after considering various styles of unit, and method of placing in use.

Daylight

Daylight Illumination, and the Intensity and Duration of Twilight (70168 C). Herbert H. Kimball. Ills. 15 pp. I E S Trans—May 1, 1916. Meteorological investigation.

Design

Fundamental Aspects of Illumination Design (73082). C. E. Clewell. 2000 w.

ILLUMINATION**Eyes**

El A—Sept., 1916. Unsatisfactory and successful systems.

Development

Light and Illumination (67997 B). 8000 w. W S E, JI—Nov., 1915. Reviews progress in increasing efficiency.

Diffusing Surfaces

L'emissione della luce dalle superfici diffidenti ed il calcolo della illuminazione (69661 B). Guido Peri. 1200 w. Apr. 2, 1916. Discussion of the emission of light from diffusing surfaces and calculation of illumination.

Diffusion

Diffusion Media—Projection and Focusing Screens (68869 C). Ills. 8 pp. I E S Trans—Feb. 10, 1916. Committee report.

Earnings

Lighting Industry Maintains Large Growth (71536). 1200 w. El W—July 1, 1916. Tabulated statistics showing increases in income and output.

Edison

The Work of Thomas Alva Edison in the Field of Illumination with Relation to the Contemporary State of the Art (70010 A). John W. Lieb. 7500 w. G E R—May, 1916. Address on Feb. 10, 1916, at Biltmore Hotel, N. Y.

Efficiency

Illumination Efficiencies as Determined in an Experimental Room (68868 C). Ward Harrison and Earl A. Anderson. Ills. 27 pp. I E S Trans—Feb. 10, 1916. New method of test giving satisfactorily accurate results.

Electric Lamps

The Evolution of the Electric Lamp (73474 A). Clifford C. Patterson. 3000 w. Eln—Sept. 15, 1916. Reviews development of the electric arc and the incandescent lamp.

Electric Lighting

Electric Lighting on Trams and Motors (73160 N). A. P. Turnbull. 2500 w. Cw E—Aug., 1916. Progress on electric lighting of vehicles.

Exposition Lighting

Illumination of the Panama-Pacific International Exposition (73409 C). Walter D'Arcy Ryan. Ills. 10 pp. I E S Trans—Aug. 30, 1916. Details of the use of electricity and gas and new devices developed.

Eyes

A Method of Studying the Behavior of the Eye Under Different Conditions of Illumination. (68870 C). F. K. Richtermyer and H. L. Howes. Ills. 14 pp. I E S Trans—Feb. 10, 1916. With discussion.

The Retinal Sensibilities Related to Illuminating Engineering (68864 C). P.

Factories

G. Nutting. Ills. 21 pp. I E S Trans—Feb. 10, 1916. Theory and applications.

Factories

Notes on the New Code of Lighting for Factories, Mills and Other Work Places (69267). C. E. Clewell. Ills. 4500 w. El J1—April, 1916.

Modern Aspects of Factory Lighting and the New Code (70170 C). C. E. Clewell. Ills. 17 pp. I E S Trans—May 1, 1916. Largely discussion of Wisconsin code. With discussion.

Natural Lighting of Manufacturing Buildings (73616 B). O. M. Becker. Ills. 3000 w. Bkbl'd—Sept., 1916. Factors determining the window area, and matters related.

See also Factory Illumination under INDUSTRIAL MANAGEMENT, *Management*.

Filaments

Experiments with Filaments Heated Electrically in Volatile Liquids (70741 A). S. W. J. Smith. Abstract of paper read before the Phys. Soc., London. 700 w. Elec—May 12, 1916. Discusses a striking phenomenon observed.

Flood-Lighting

Flood-Lighting (71197). John A. Hoeveler. Ills. 1800 w. Wis E—May, 1916. Advantages, applications, etc.

Flood Lighting of Bathing Beaches (71660). Ills. 2500 w. El R & W E—July 8, 1916. Installations in Chicago.

Flood Lighting the World's Tallest Building (72708). H. H. Magdsick. Ills. 1800 w. El W—Aug. 26, 1916. Equipment for illuminating the Woolworth Tower.

Flux

Simple Methods of Computing Light Flux and Horizontal Illumination. (68865 C). W. E. Hodge and R. W. Chadbourne. Ills. 7 pp. I E S Trans—Feb. 10, 1916.

Gas-Filled Lamps

Half-Watt Lamps from the Central Station Standpoint (65773 A). Elec Rev, Lond—Nov. 5, 1915. Advantages and economy.

Campo e metodi di applicazione delle lampade a tungsteno in gas inerte (67013 B). Guido Peri. Ills. 2400 w. Ind—Dec. 19, 1915. Serial, 1st Part. Characteristics and applications of gas-filled incandescent lamps.

Gas Lighting

Gas Lighting in a Cathedral (74040 C). James D. Lee, Jr. Ills. 3500 w. I E S, Trans—Oct., 1916. Treats particularly of an installation of semi-direct gas lighting.

ILLUMINATION

Incandescent Lamps

Good Lighting

The Fundamental Principles of Good Lighting (66333). Dr. P. G. Nutting. 6500 w. G A—Dec. 15, 1915. Outlines the principles upon which the theory of good lighting is based.

Headlights

Incandescent Headlights for Street Railway and Locomotive Service (71497 A). P. S. Bailey. Ills. 2500 w. G E R—July, 1916. Requirements; equipment and performance.

Hefner Lamps

The Dependence of the Light of the Hefner Lamp on Atmospheric Conditions—More Especially Atmospheric Pressure (66065 A). Dr. E. Ott. Ills. 3500 w. Eln—Nov. 19, 1915. Determined by measurements in closed receiver.

Illuminants

Relative Photographic and Visual Efficiencies of Illuminants (67795 C). L. A. Jones, M. B. Hodgson and Kenneth Huse. Ills. 24 pp. Illum Eng Soc Trans—Dec. 20, 1915. Report of experiments; with discussion.

Illuminating Engineering

The Scope of Illuminating Engineering (73408 C). Charles P. Steinmetz. 1200 w. I E S, Trans—Aug. 30, 1916. Defines the term. Effects of light are outlined.

Incandescent Arc

A New High-Efficiency Incandescent Lamp (66440 N). E. A. Gimingham and S. R. Mullard. Ills. 2500 w. I E E—Nov. 29, 1915. Small arc in gas-filled bulb.

Incandescent Lamps

Incandescent Lamp Progress (67202). R. W. Shenton. 700 w. El A—Jan., 1916. New developments during 1915.

Zur Konstruktion und Berechnung des Leuchtkörpers einer Glühlampe. (68871 B). O. Kruh. Ills. 2000 w. E u M—Feb. 20, 1916. Serial, 1st part. Notes on calculating and constructing the luminous body in an incandescent lamp.

Life Testing of Incandescent Lamps at the Bureau of Standards. (69146 N). G. W. Middlekauff, B. Mulligan and J. F. Skogland. Ills. 25 pp. U S B S, Sci paper 265—March 16, 1916. Apparatus, methods and purposes.

Recent Developments in Incandescent Lamps (69040). M. D. Cooper. 1600 w. Wis E—March, 1916. Progress.

Rating of Incandescent Lamps According to Their Watts (73101 A). R. Naujokz. 1000 w. Eln—Aug. 25, 1916. Abstract from *Elektro Zeit*. Critical discussion.

The Characteristics of Tungsten Filaments as Functions of Temperature

Industrial

ILLUMINATION

Moore Tubes

(73214 A). Irving Langmuir. 5000 w. ElN—Sept. 1, 1916. Various functions for estimating the temperature of filaments.

La Regularidad Necesaria para Evitar el Titilaje de Lamparas de filamentos Metalico (73514 D). Simons y Capderila. Ills. 4100 w. U N P—No. 21, Feb., 1916. Mode of avoiding flicker in metallic filament lamps.

Industrial

Recent Progress in Industrial Lighting (69587 A). L. Gaster. Abstract of paper before the Assn. of Super. Electns. 3000 w. Mch E—March 31, 1916.

Interiors

Interior Illumination with Mazda C Lamps (72884 A). A. L. Powell. Ills. 3000 w. G E R—Sept., 1916. Outline of different classes of lighting.

Lighting That Combines Art and Science (72965). Dr. Louis Bell. Ills. 2000 w. El W—Sept. 2, 1916. Recent developments in inoor lighting.

The Artificial Illumination of Interiors as Related to Architecture and Decoration (74039 C). David Crownfield. 3000 w. I E S, Trans—Oct., 1916. Exposition of the capacity of artificial light to illuminate sculpture, painting, decorated surfaces, etc., and effect of color quality.

Lamp Rating

Candle-Power Measurements of Series Gas-Filled Incandescent Lamps (69201 A). Ralph C Robinson. Ills. 1200 w. G E R—April, 1916. Methods of rating and apparatus used.

Lamps

The Development and Use of the Mazda C Lamp (70653). W. A. McKay. Ills. 1500 w. El JI—June, 1916. Types for various services.

Incandescent Lamp Developments (71209 C). G. S. Merrill. Read at Chicago. 14 pp. I E S, Trans—June 10, 1916. Factors affecting average efficiency and initial efficiency.

A Review of the N. E. L. A. Lamp Committee Report (72207 A). G. F. Morrison. Ills. 3000 w. G E R—Aug., 1916. Present status of the lamp industry.

See also Motion Pictures, under *Illumination*.

Lamp Service

Operation of a Lamp Service Department (74177). L. A. Coleman. Ills. 1500 w. El W—Oct. 28, 1916. Plan for furnishing lamps and lamp renewal service.

Lectures

A Course of Lectures on Illuminating Engineering (72206 A). C. E. Clewell. 2500 w. G E R—Aug., 1916. Information concerning lectures in Philadelphia.

Legislation

Establishing a Basis for Laws on Lighting (66750). C. E. Clewell. 2000 w. El W—Dec. 25, 1915. British report and recommendations reviewed.

Lighting Legislation. (68867 C). L. B. Marks. 27 pp. I E S Trans—Feb. 10, 1916. Examination of various State laws with discussion.

Light

A Century of Light (74038 B). Walton Clark. 4000 w. F I, JI—Oct., 1916. Wonderful growth of artificial illumination.

Lighting

The Calculation of Illumination (73083). R. Thistlewhite. Ills. 3500 w. El A—Sept., 1916. Methods of determining the number and size of lamps.

The Downtown Lighting System for San Francisco (72963). Walter D'Arcy Ryan. Ills. 1500 w. El W—Sept. 2, 1916. Details of ornamental lighting.

The Fundamentals of Lighting (72883 A). M. Luckiesh. 2000 w. G E R—Sept., 1916. Importance of studying light, shade and color.

Lighting Fixtures

Installation of Lighting Units in Power Stations (70369). M. M. Samuels. Ills. 2000 w. El W—May 13, 1916. Selection and mounting.

Luminescence

Luminescence et absorption dans l'atmosphère solaire et dans les tubes a gaz raréfiés. (68809 D). A. Perot. Ills. 9 pp. S I E, Bul—Jan., 1916. Discussion of phenomena of luminescence and absorption in solar atmosphere and in tubes of rarefied gas.

Luminous Equivalent

Equivalent lumineux de l'énergie radiante (70143 B). Ills. 3000 w. Ind Elec—April 25, 1916. Methods of determining the luminous equivalent of radiant energy.

Mercury-Vapor Lamps

Industrial Lighting with Mercury-Vapor Lamps (67793 C). William A. D. Evans. Ills. 21 pp. Illum Eng Soc Trans—Dec. 20, 1915. Data on varied applications; with discussion.

Miniature Lamps

Small Incandescent Lamps and Special Illumination Problems (67799 C). Robert P. Burrows. Ills. 14 pp. Illum Eng Soc Trans—Dec. 20, 1915. Uses and characteristics; with discussion.

Moore Tubes

Gaseous Conductor Lamps for Color Matching (69627 C). D. McFarlan Moore. Ills. 30 pp. I E S Trans—Mar. 20, 1916. New method of filling with

Motion Pictures

CO, and character of light obtained; with discussion.

Motion Pictures

Electrical Equipment for Motion Picture Machines (70652). A. M. Candy. Ills. 3000 w. El JI—June, 1916. Superiority of direct current; types of apparatus, etc.

Incandescent Lamps for Moving Pictures (70656). W. T. Birdsall. 1000 w. El JI—June, 1916. Outlines the technical limitations in applying the Mazda C lamp.

Museums

Lighting an Art Gallery With "Day-light" Lamps (74178). Ills. 1500 w. El W—Oct. 28, 1916. Installation in the new Cleveland Museum of Art.

Navy

Illumination in the Navy (71968 B). C. S. McDowell, with discussion. 15 pp. I E S, Trans—July 20, 1916. General illumination on shipboard, searchlights, and signalling.

Parabolic Mirrors

The Parabolic Mirror (67794 C). Frank A. Benford. Ills. 27 pp. Illum Eng Soc Trans—Dec. 20, 1915. Performance with actual light sources; with discussion.

Philadelphia

A Century of Light in Philadelphia (71995 A). W. J. Serrill. 5500 w. E C P, Pro—July, 1916. Progress of artificial lighting, particularly domestic lighting.

Photography

The Mazda Lamp in Photography. (68422 A). W. E. Brewster. Ills. 4500 w. G E R—March, 1916. Characteristics which render them adaptable.

Lighting of a Modern Photographic Studio (70794). V. A. Clarke. Ills. 1500 w. El R & W E—June 3, 1916. Use of white-flame arc lamp for photography.

Projection

The Projecting Lantern (70169 C). John B. Taylor. Ills. 22 pp. I E S Trans—May 1, 1916. Brief review; with discussion.

See also Photometry under *Measurement*.

Radiation

Illumination from a Radiating Disk (69144 N). Paul D. Foote. 500 w. U S B S, Sci paper 263—March 13, 1916. Investigation.

Railway Cars

Electric Lighting of Railway Passenger Cars (69412 A). 2500 w. R M M—April, 1916. Systems in use; their care.

Reflection

The Light-Reflecting Values of White and Colored Paints (67450 B). Henry A. Gardner. Ills. 1500 w. F I JI—Jan.,

ILLUMINATION

Stage Lighting

1916. Effect on illumination, tests of a series of colors.

Watts vs. Wallpaper (71681). S. G. Hibben. 2000 w. El JI—July, 1916. Effects of colors on the lighting of rooms.

Reflectors

Some Experiments on the Eye with Inverted Reflectors of Different Densities. (67798 C). C. E. Ferree and G. Rand. Ills. 74 pp. Illum Eng Soc Trans—Dec. 20, 1915. With extended discussion.

Recent Developments in Show Window Lighting Reflectors (68292 A). Ills. 1200 w. Wis E—Feb., 1916. Types and efficiency.

Efficiency of Projectors and Reflectors (69813 A). Haydn T Harrison. Abstract of paper before Liverpool Eng. Soc. 2200 w. Eln—March 17, 1916. Results of research and study.

Refractories

The Possibilities of Developing Super-Refractory Materials for Incandescent Lighting (73407 N). F. A. Fahrenwald. 1700 w. A El S—Sept., 1916. Outlines the boundaries of fields for research.

Searchlights

See same heading under MARINE AND NAVAL ENGINEERING.

Searchlight Carbons (69460 B). R. B. Chillas, Jr. 7000 w. U S Artill, JI—March-April, 1916. Manufacture, choice carbons, characteristics, etc.

The Sperry Searchlight (72602 B). Adelno Gibson. Ills. 10 pp. U S A, JI—July-Aug., 1916. Details of the arc source of light and its advantages, and the operation of the lamp.

Modern Electric Searchlight Projectors (73704 A). J. H. Johnson. Ills. 3500 w. Enr—Sept. 15, 1916. Serial, 1st part. Approximate data and formulae based on observations from numerous tests.

Series Lighting

Characteristics of a Series Lighting System (71664). Roy E. Uptegraff. 700 w. El W—July 8, 1916. Variations in current and power-factor.

Ships

The Lighting of Ships (69629 C). H. A. Hornor. Ills. 19 pp. I E S Trans—Mar. 20, 1916. Requirements and methods; with discussion.

Shop Lighting

Light and Munitions (71898 A). Daniel H. Ogley. Ills. 4000 w. C E M—July, 1916. Importance of good lighting in factories.

Stage-Lighting

An Indoor and Outdoor Stage-Lighting Outfit (73887). Ills. 1800 w. E R & W E—Oct. 14, 1916. Inexpensive equipment.

Street Lighting

ILLUMINATION

Theory

Street Lighting

Milwaukee's Extensive Street-Lighting Plan (68979). Ills. 1500 w. El W—March 16, 1916. Experimental installation.

A Model Street Lighting Installation (68424 A). Irving Langmuir. 2500 w. Diggs. Ills. 2000 w. G E R—March, 1916. In Port Jervis.

Economics of Group System of Street Lighting (71972). Montague Ferry. 1200 w. El W—July 22, 1916. How material and labor saving can be effected.

Street Lighting Installation in Port Jervis, New York (71596 A). H. A. Tinson and D. M. Diggs. Ills. 2000 w. Mun E—July, 1916. Edison Mazda series lamps.

Recent Street Lighting Problems and Developments (72605 B). J. R. Cravath. 2500 w. W S E, JI—June, 1916. Rating and depreciation of lamps spacing, and other problems.

Some Experiences in Connection with Chicago's Street Lighting System (72606 B). Arthur C. King. 12 pp. W S E, JI—June, 1916. Conditions and lamp tests.

An Improved Form of Street Lighting Contract (72966). 2500 w. El W—Sept. 2, 1916. Features of indeterminate form of agreement.

Incandescent Street Lighting Regulating Apparatus (72885 A). H. H. Reeves. Ills. 2000 w. G E R—Sept., 1916. Theory of regulators designed to control constant-current series circuits.

Providing Adequate Street Illumination for Unusual Local Conditions. (73428). Ills. 1200 w. El W—Sept. 23, 1916. Methods used in N. Y. City.

A Civic Duty for Engineers (73999 A). S. E. Doane. Ills. 38 pp. C E S, JI—Sept., 1916. Engineering phases of street lighting and the possibilities for improving appearances.

Development of Electric Street Lighting (73998 A). Charles F. Brush. 1500 w. C E S, JI—Sept., 1916. Account of first public exhibition of the arc lamp.

Salt Lake City's Splendid New Street Lighting (73781). Ills. 1200 w. El R & W E—Oct. 7, 1916. Ornamental and efficient lighting.

Streets

Discussion on "The Effective Illumination of Streets" (Millar) Deer Park, Md., June 30, 1915 (66870 D). 5500 w. A I E E—Dec., 1915.

Street Lighting by White Flame Arc Lamps (67203). Ben Perris. Diagrams. 1500 w. El A—Jan., 1916. The advantages.

The Effective Illumination of Streets (67797 C). Preston S. Millar. Ills. 41 pp. Illum Eng Soc Trans—Dec. 20, 1915. With extended discussion.

Street Lighting in Detroit (69443 A). 3000 w. Mun E—April, 1916. Data from annual report.

Street Lighting on a Cost-of-Service Basis (69232). G. W. Van Derzee. 2500 w. El W—April 1, 1916. Abstract of paper before Wis. Elec. Assn.

The New Street-Lighting System of Milwaukee (69228). Ills. 3000 w. El R & W E—April 1, 1916. Serial, 1st part.

Discussion of Papers by Halvorsen, Rogers, and Hussey; by Rolinson; and by Vaughn (70165 C). Ills. 18 pp. I E S Trans—May 1, 1916.

A Practical Application of the Principles of Scientific Street Lighting (70164 C). F. A. Vaughn. Ills. 33 pp. I E S Trans—May 1, 1916.

New Types of Incandescent Lamps and Their Relation to the Street Lighting Problem (70163 C). W. H. Rolinson. Ills. 13 pp. I E S Trans—May 1, 1916.

Arc Lamps for Street Illumination (70162 C). C. A. B. Halvorsen, Jr., S. C. Rogers, and R. B. Hussey. Ills. 18 pp. I E S Trans—May 1, 1916.

Milwaukee's New Municipal Street Lighting System (70352). F. H. Bernhard. Ills. 2500 w. Mun JI—May 11, 1916. Serial, 1st part.

Glare in Street Lighting (71208 C). Report No. 13, I. E. S. Committee. 2500 w. I E S, Trans—June 10, 1916. Distinctive features. Laws outlined and causes discussed.

The Electric Lighting of Small Towns (70848 A). H. N. Munro. From paper read before Jun. Inst. of Engrs. 3300 w. S M C E—May 19, 1916. Suggestions for the promotion of such schemes.

Tests of Street Illumination (71207 C). Preston S. Millar. Ills. Also discussion. 38 pp. I E S, Trans—June 10, 1916. Investigations of effectiveness.

Theater Lighting

Analysis of Moving Picture Theater Lighting (71813). L. W. McOmber. Ills. 2500 w. El W—July 15, 1916. Serial, 1st part. Results of a study.

The Possibilities of Stage Lighting Together with an Account of Several Recent Productions (71967 C). Bassett Jones. Ills. 25 pp. I E S, Trans—July 20, 1916. Requirements of specific examples.

Theory

Light and Lighting (67633 A). Edward P. Hyde. 1700 w. G E R—Feb., 1916. Inter-relations between sciences of light and of lighting.

Train Lighting

Train Lighting

Train Lighting by Electricity (71018 A). 5000 w. R E—June, 1916. Serial. 1st part. Requirements and difficulties.

Trains

See Train Lighting under RAILWAY ENGINEERING, *Motive Power and Equipment*.

Tungsten

The Melting-Point of Tungsten (67230 A). Irving Langmuir, in *Phys. Rev.* 600 w. Eln—Dec. 24, 1915. Values determined by three methods.

Tungsten Filaments

The Characteristics of Tungsten Filaments as Functions of Temperature. (68424 A). Irving Langmuir. 2500 w. G E R—March, 1916. Analysis.

Tungsten Wire

The Manufacture of Drawn Tungsten Wire (68260 A). Abstract from *Elektro Zeit.* 1500 w. Eln—Feb. 4, 1916. Patents.

Ultra-Violet Radiation

Apparatus for Producing Ultra-Violet Radiation (69199 A). W. S. Andrews.

MEASUREMENT

Curves

Ills. 1200 w. G E R—April, 1916. Apparatus recently designed.

Uniformity

L'influenza della forma del solido fotometrico dell' altezza e della distanza delle lampade sul grado di uniformita della illuminazione (66209 B). Guido Peri. Ills. 2500 w. Ind—Nov. 7, 1915. Uniformity of illumination from a lamp as affected by the form of the photometric body, its height and distance from lamp.

Vision and Brightness

Vision and the Brightness of Surroundings (70167 C). Percy W. Cobb. Ills. 26 pp. I E S Trans—May 1, 1916. Results of investigation. With discussion.

Voltage

Voltage Regulation for Electric Lighting Systems (71494 A). George P. Roux. Ills. 2500 w. G E R—July, 1916. Commercial motives that made regulation necessary apparatus used, etc.

Yellow Light

Yellow Light (67796 C). M. Luckiesh. Ills. 24 pp. Illum Eng Soc Trans—Dec. 20, 1915. Analysis of characteristics; with discussion.

MEASUREMENT

A. C. Phenomena

Application of a Polar Form of Complex Quantities to the Calculation of Alternating Current Phenomena (71232 D). N. S. Diamant. 20 pp. A I E E, Pro—June, 1916. Mathematical.

Alternating Current

Ueber Wechselstrommessungen (65441 B). Richard Hiecke. Ills. 3500 w. E u M—Oct. 17, 1915. Certain features in the measurement of alternating currents.

Alternating-Current Ammeters and Voltmeters (65664 A). Ills. 4000 w. Elect'n, Lond—Oct. 29, 1915. Types, tests, and features of different instruments.

Ampere-Hour Meters

Applications of the Ampere-hour Meter (69424 A). Scott Lynn. Ills. 7000 w. S J I E—April, 1916. Mercury motor type.

Chemi-Hydrometry

See Flow under CIVIL ENGINEERING, *Measurement*.

Circle Diagram

The Circle Diagram for Single-Phase Circuits (72998). Charles Fortescue. 1500 w. El JI—Sept., 1916. Construction of the diagram and its use.

Circular Currents

Calculation of the Maximum Force Between Two Coaxial Circular Currents. (68728 N). Frederick W. Grover. 57

pp. U S B S—Feb. 3, 1916. Formulas and examples.

Converters

Tests on a Polyphase Continuous-Current Converter of 3000 kw. Capacity (70438 A). C. F. Holmboe. Abstract trans. from *Elektro. Zeit.* Curves. 700 w. Eln—April 28, 1916.

Corona

Corona as a Standard for Measuring High Voltage (71128). Dr. J. B. Whitehead. Ills. 3800 w. El W—June 17, 1916. Laws governing corona formation.

See also Voltmeters, under *Measurement*.

Current

Simple Thermal Instruments for the Measurement of Current (66066 A). W. H. Eccles and A. J. Makower. 800 w. Eln—Nov. 19, 1915. High frequency currents of small magnitude.

Current Meters

Walzen-Umschalter für Amperemeter mit mehreren Messbereichen (67730 B). R. Edler. Ills. 800 w. P R—Jan. 5, 1916. Drum switch for meters, having increased range; construction and operation.

Curves

Graphic Method for Speed-Time and Distance-Time Curves (65889 D). 42 pp.

Consult Classification of the Index. See page 7.

Damped Oscillations

Am Inst Elec Engrs, Pro—Nov., 1915.
Discussion at New York, Nov. 13, 1914,
of E. C. Woodruff's paper.

Damped Oscillations

A Mode of Studying Damped Oscilla-
tions by the Aid of Shrinking Vectors
(66442 N). David Robertson. 5000 w.
I E E—Nov. 29, 1915. Equations.

Dielectrics

Compensated Dynamometer Wattmeter
Method of Measuring Dielectric Energy
Loss (73589 A). G. B. Shanklin. Ills.
3500 w. G E R—Oct., 1916. Recently
developed method that has given satisfac-
tory results.

Dynamometer

The Electric Dynamometer. (69039).
F. E. Fisher. Ills. 2000 w. Wis E—
March, 1916. Description; advantages.

Dynamos

The Predetermination of the Perform-
ance of Dynamo-Electric Machinery
(67552 N). Miles Walker. Ills. 10800
w. I E E—Jan., 1916. Outlines a
method applicable to all types.

Dynamo Testing

Considerazioni Sulle Macchine Elet-
triche A Gran Velocita Turbo-Dinamo E
Turbo-Motori (74214 B). S. Consigliere.
Ills. 2000 w. Ind—Sept. 10, 1916.
Methods of determining armature balance
at high speeds.

Earth Plates

The Calculation of the Effective Resist-
ance of Earth Plate (66683 A). G. W.
O. Howe. 2500 w. Eln—Dec. 10, 1915.
Equivalent length calculated without
measurement of specific resistance.

Efficiency

Simple Chart for Finding Plant Effi-
ciency (71554). W. F. Schophorst. 1000
w. El R & W E—July 1, 1916. Chart,
with explanation of its use.

Electric Furnaces

Heat Losses from an Electric Furnace
(65381 A). W. H. Wills and A. H.
Schuyler. 1800 w. Ir Age—Nov. 4, 1915.
Experimental investigations.

Electric Units

Electric Units and Standards (73818).
65 pp. U S B S, No. 60—Sept. 25, 1916.
Up-to-date information.

Electromagnetic Units

The Interpretation of Electro-magnetic
Units (69566). M. Ascoli. Abstract
translation from the Italian, by Dr. A. E.
Kennelly. 2000 w. El W—April 15,
1916. Inconsistencies; suggestions for re-
moval.

Electroscopes

Comparison of the Ionization Currents
Due to Equal Quantities of Radium Ema-
nation in Different Types of Electroscopes

MEASUREMENT

(73396 N). T. H. Leaming, Herman
Schlundt, and Julius Underwood. 4000 w.
A El S—Sept., 1916. Experimental data.

Fans

The Testing of Fan Motors (72993).
O. F. Rowe. Ills. 2000 w. El JI—Sept.,
1916. Necessary tests, and methods.

Galvanometers

General Design of Critically Damped
Galvanometers (69757 N). Frank Wen-
ner. 34 pp. U S B S, Sci paper 273—
April 12, 1916. Theory and design.

Sensitivity and Magnetic Shielding
Tests of a Thomson Galvanometer for
Use in Radiometry (71862). W. W. Cob-
lantz. Ills. 24 pp. U S B S, Sci paper
282—June 30, 1916. Details of construc-
tion and results of tests.

High Tension

Variations in the Wave-Shape in High-
Tension Testing Installations (66807 A).
Dr. Gustav Benischke. Abstract from
Electro. Zeit. Diagrams. 1500 w. Eln—
Dec. 17, 1915. A study.

Ueber Messungen an Hochspannungs-
kabeln im Leerlauf- und Kurzschluss-
Versuch (70187 B). W. Kummer. Ills.
6 pp. Schweiz Elektro Ver—Mar., 1916.
Methods of measuring in high-tension ca-
bles in prosecuting light-load and short-
circuit investigations.

High Voltage

Notes on the Measurement of High
Voltage (67683 D). William R. Work.
Ills. 2000 w. A I E E, Pro—Feb., 1916.
Experiments on accuracy of certain
methods.

Hysteresis

Over enkele formules voor het hystere-
sisverlies in dynamoplatten (67700 B). C.
J. Oosterholt. Ills. 4000 w. Ing—Jan.
1, 1916. Discussion of formulas for
dynamo hysteresis losses.

Graphic Determination of Hysteresis
Loss (72068 A). A Castex. 800 w. Eln
—July 14, 1916. Describes an abac for
rapidly estimating.

Illumination

Short Cuts in Calculations for Lighting
Systems (65615). Robert Ffrench Pierce.
2500 w. Am Gas Lgt Jour—Nov. 8, 1915.
Charts and their use.

Inductance

Methods of Measuring the Inductances
of Low-Resistance Standards (65966 N).
Frank Wenner, Ernest Weibel, and F. B.
Silsbee. 2500 w. U S Bureau of Stand—
Oct. 28, 1915. Two methods for determin-
ing the phase angles of low-resistance
standards without recourse to computed
values.

On a General Bridge Method for Com-
paring the Mutual-Inductance Between

Instruments

Two Coils with the Self-Inductance of One of Them (70440 A). Charles H. Lees. 1000 w. Eln—April 28, 1916. Abstract of paper before Phys. Soc. of London.

Instruments

Measuring Instruments (73484 A). C. V. Drysdale. Ills. 4500 w. Eln—Sept. 15, 1916. Electrical instruments.

A Direct-Reading Device for Use in Computing Characteristics of Vacuum Tungsten Lamps (with Computing Chart) (65973 N). J. F. Skogland. 20 pp. U S Bureau of Stand—Nov. 8, 1915. The device and its use.

Instrument Transformers

Errors Due to the Use of Instrument Transformers (66377). R. H. Chadwick. 1200 w. El W—Dec. 1, 1915. Effect of angle of phase displacement.

Insulation

Testing Insulating Materials for Dielectric Strength. (68608). Kennedy G. Rockworth. Ills. 3000 w. El A—March, 1916. Routine tests for faults.

Insulators

Electrical Porcelain (65892 D). 24 pp. Am Inst Elec Engrs, Pro—Nov., 1915. Discussion at New York, Feb. 19, 1915, of E. E. F. Creighton's paper.

Testing for Defective Insulators on High Tension Transmission Lines (72380 D). B. G. Flaherty. 15 pp. A I E E, Pro—Aug., 1916. Importance of field tests and three methods of making them.

Ionic Velocities

New Method of Determining Ionic Velocities (70047 A). Constance Harrison Griffiths. Abstract of paper before Phys. Soc. of London. Ills. 1200 w. Eln—April 21, 1916. Theory; apparatus; results.

Iron Wire Tests

Skin Effect Factors for Iron Wire (70703 A). John D. Ball. 1200 w. G E R—June, 1916. Formulae for computing the effective resistance and a table.

Light

Metodi approssimati per la determinazione della intensità media e del flusso delle sorgenti luminose (68317 B). Guido Peri. Ills. 2000 w. Ind—Feb. 6, 1916. Outline of approximate method for determining average intensity and flux of a source of light.

Losses

An Analysis of Vapor-Rectifier Losses (71129). Dr. William Tschudy. 2000 w. El W—June 17, 1916. Mathematical demonstration.

Formulas for Lines With Uniform Leak Loads (71275). A. E. Kennelly. 1500 w.

MEASUREMENT

El R & W E—June 24, 1916. New formulas.

Luminosity

A Luminescence Comparator (73596 A). W. S. Andrews. Ills. 500 w. G E R—Oct., 1916. Device for determining the degree of increase or decrease in the luminosity of self-luminous compositions over a period of time.

Magnetism

The Magnetic Testing of Bars of Straight or Curved Form (66443 N). Albert Campbell and D. W. Dye. Ills. 6000 w. I E E—Nov. 29, 1915. Different methods.

Ueber die Korrekturen bei magnetischen Messungen an ringförmigen Probestücken (67722 B). Edy Velander. Ills. 2400 w. E u M—Jan. 2, 1916. Corrections to be applied to magnetic measurements of annular test pieces.

The Determination of the Constant of a Solenoid (73362 B). S. R. Williams. Ills. 2500 w. F I, JI—Sept., 1916. Practical method for testing by experiment.

Magnetometer

A Sensitive Magnetometer (73100 A). P. E. Shaw, and C. Hayes. 1000 w. Eln—Aug. 25, 1916. Abstract of paper before the Phys. Soc. Report of investigations.

Meters

Watt-hour Meters (66047). O. H. Henschel. Ills. 1500 w. P E, C—Nov. 15, 1915. Serial, 1st part. Installation, care, adjustment and types.

Inrichting en werkingwijze van een moderne meterafdeeling bij een electriciteits-bedrijf (67000 B). A. F. E. Hanson. Ills. 7500 w. Ing—Dec. 18, 1915. Methods of adjusting and handling meters in Electra Works, Amsterdam.

Discussion on "The Induction Watt-Hour Meter," Deer Park, Md., July 2, 1915 (67484D). 3500 w. A I E E, Pro—Jan., 1916. V. L. Hollister's paper.

A New Frequency Meter (71632 A). W. Peukert. Abstract from *Elek. Zeit.* 1000 w. Eln—June 16, 1916. Results of tests on which this meter was constructed.

Timing Relay Operation With a Rotating Standard (71665). W. H. Fellows. Ills. 800 w. El W—July 8, 1916. Tests to show that a rotating standard watt-hour meter is preferable to a stop watch in measuring small intervals of time.

Molten Materials

New Method for Measuring Resistivity of Molten Materials: Results for Certain Alloys (74032 B). E. F. Northrup and R. G. Sherwood. Ills. 7500 w. F I, JI—Oct., 1916. Methods and results.

Motor Testing

Sulla Prova In Opposizione Dei Motori Asincroni (73526 B). Ills. 2500 w. Ind—

Consult Classification of the Index. See page 7.

Oil Switches

—Sept. 3, 1916. Testing synchronous motors by opposition method.

Oil-Switches

Tests on Oil-Switches (72572 A). Bruno Bauer. 3000 w. Eln—Aug. 4, 1916. Abstract of third report of the Commission on High-tension Apparatus.

Oscillograms

The Amplitude and Phase of the Higher Harmonics in Oscillograms (66441 N). G. W. O. Howe. 2500 w. I E E—Nov. 29, 1915. Investigation.

Photometry

The Physical Photometer in Theory and Practice (68062 B). W. W. Coblenz. 2500 w. F I JI—Feb., 1916. Conditions for absorbing all the infra red rays.

Photometry of the Gas-Filled Lamp. (69145 N). G. W. Middlekauff and J. F. 264—March 16, 1916. Experimental Skogland. 18 pp. U S B S, Sci paper study of variables.

An Interlaboratory Photometric Comparison of Glass Screens and of Tungsten Lamps, Involving Color Differences (69625 C). G. W. Middlekauff and J. F. Skogland. Ills. 23 pp. I E S Trans—Mar. 20, 1916. Results of investigation; with discussion.

A Box Photometer (69624 C). L. O. Grondahl. Ills. 12 pp. I E S Trans—Mar. 20, 1916. Description of device.

The Theory of Some Variable Neutral Tint-Absorbing Screens. (68756 B). E. F. Kingsbury. 800 w. F I, JI—March, 1916. Methods of varying intensity of light flux.

The Integrating Photometric Sphere. Its Construction and Use (70171 C). E. B. Rose and A. H. Taylor. Ills. 26 pp. I E S Trans—May 1, 1916. With discussion.

An "Average Eye" for Heterochromatic Photometry, and a Comparison of a Flicker and an Equality-of-eye Brightness Photometer (70166 C). E. C. Crittenden and F. K. Richtmeyer. Ills. 36 pp. I E S Trans—May 1, 1916. With discussion.

Photometric Methods in Connection with Magic Lantern and Moving Picture Outfits and a Simple Method of Studying the Intrinsic Brilliancy of Projection Sources (70014 A). J. A. Orange. 1000 w. G E R—May, 1916. Apparatus described.

An Interlaboratory Photometric Comparison of Glass Screens and of Tungsten Lamps, Involving Color Differences (71318). G. W. Middlekauff and J. F. Skogland. 20 pp. Charts. U S B S—Scientific Paper 277. Investigation of variations in results from different laboratories.

MEASUREMENT

Rheostats

Porcelain Tests

Experiences in Testing Porcelain (71226 D). E. E. F. Creighton. 2000 w. A I E E, Pro—June, 1916. Results.

Testing of Electrical Porcelain (70700 A). E. E. F. Creighton and P. E. Hosegood. Ills. 2000 w. G E R—June, 1916. Methods to meet service conditions.

Potentiometer

The High-Voltage Potentiometer (72377 D). Harris J. Ryan. Ills. 6 pp. A I E E, Pro—Aug., 1916. Describes a device intended for investigations.

Power Factor

Modern Methods of Correcting Power Factor (71644 A). Ills. 2200 w. Enr—June 16, 1916. Serial, 1st part. Schemes that have been devised for eliminating wattless currents.

Power Factor Explained (71569). F. A. Annett. Ills. 3500 w. Pwr—July 4, 1916. Simple explanation of inductance and capacity.

Pyrometers

How Electrical Pyrometers Are Made (73541). R. P. Brown. Ills. 2000 w. I T R—Sept. 28, 1916. Fundamental principles, with details of instrument.

Reactors

Properties of Reactor with Iron Core and Air Gap (69943). Shiro Sano. Ills. 700. El W—April 29, 1916. Simple equations.

Recorders

Industrial Multiple Recorder (73592 A). R. H. Rogers. Ills. 700 w. G E R—Oct., 1916. Device to show a continuous record of various apparatus.

Recording Meters

Classification, Construction, and Application of Graphic Recording Meters (65345). A. E. Allen. Ills. 3000 w. Elec Jour—Nov., 1915. Usefulness of graphic meter records.

Resistance

Ueber eine Nullmethode für die Messung von Widerständen jeder Grössenstufe (68316 B). J. Ondracek. Ills. 1800 w. E u M—Jan. 30, 1916. Exposition of zero method of measuring resistances however high.

Construction of Primary Mercurial Standards. (68729 N). F. A. Wolff, M. P. Shoemaker and C. A. Briggs. Ills. 90 pp. U S B S—Feb. 3, 1916. Theoretical and experimental details.

Resistivity

A Method of Measuring Earth Resistivity. (68731 N). Frank Wenner. Diagrams. 2500 w. U S B S—Feb. 3, 1916. Method suggested.

Rheostats

Practical Calculation and Construction of Rheostats (70977). Norman G. Meade.

Consult Classification of the Index. See page 7.

Short Circuits

Ills. 1800 w. El A—June, 1916. Serial, 1st part. Descriptive.

Considérations Sur Le Réglage Par Rhéostats (73513 B). Ills. 2600 w. S I E—Aug. 25, 1916. Calculation of capacity of rheostats for various situations.

Short Circuits

Approximate Solution of Short-Circuit Problems (70698 A). E. G. Merrick. Oscillograms. 1800 w. G E R—June, 1916. Examples typical of actual practice.

An Approximate Method of Calculating Short-Circuit Current in an Alternating-Current System (70699 A). H. R. Wilson. Diagrams. 1200 w. G E R—June, 1916. Mathematical.

Small Machines

The Testing of Household Appliances (71294). H. A. Cozzens, Jr. 1500 w. El W—June 24, 1916. How devices are investigated.

Sphere Gap

A Source of Error When Using the Sphere Gap. (68980). R. H. Marvin. 1500 w. El W—March 18, 1916. Puzzling irregularities; cause and prevention.

Standardization

Notes Relating to the Electrical Machinery Sections of the Standardization Rules of the American Institute of Electrical Engineers (67639 A). H. M. Hobart. 7500 w. G E R—Feb., 1916. Notes based on the July, 1915, edition of the American Rules.

Standards

Improvements in the Sensitiveness of Apparatus at the B. O. T. Electrical Standards Laboratory (73483 A). A. P. Trotter. 2000 w. Eln—Sept. 15, 1916. Account of steps taken to obtain greater sensitiveness of two instruments.

Steel

I. The Electrical Testing of Conductivity Steel. C. H. Ridsdale. II. Determination of Conductivity of Steel Rails by the Kelvin Double Bridge. S. W. Melsom (69760 N). Two papers discussed together. Ills. 55 pp. W S I S I, JI—Dec., 1915.

Stoneware

Elasticity and Strength of Stoneware and Porcelain (66570 N). James E. Boyd. Ills. 3500 w. A S M E—Dec., 1915. Investigation to obtain information needed in designing insulators.

Elasticity and Strength of Stoneware and Porcelain. (68657 A). James E. Boyd. Ills. 5000 w. A S M E JI—March, 1916. Abstract of paper with discussion.

Stray Currents

Zur Anwendung der Theorie der örtlichen und verketteten Streufelder

MEASUREMENT

(67721 B). Alfred Winkler. Ills. 2500 w. E u M—Jan. 2, 1916. On applications of theory of local and interlinked stray currents.

Stress

Stress Distributions in Engineering Materials (73465 A). 4000 w. Eng—Sept. 15, 1916. Interim report, giving papers by C. E. Stromeyer, W. Mason, T. E. Stanton and R. G. Batson.

Substations

Meter Equipment of Outdoor Substations (72995). Lester C. Hart. Ills. 700 w. El JI—Sept., 1916. Examples of best practice.

Telephonometry

Telephonometry (70998 A). B. S. Cohen. Ills. 1500 w. Eln—May 26, 1916. Serial, 1st part. Standard cable measurement and transmission testing. A new device.

Temperatures

Temperature Tests on Niagara Falls Power Company Generator (69268). T. Spooner. Ills. 2000 w. El JI—April, 1916. Methods and results.

Tester

Construction of a Simple Illumination Tester (73248). Clayton H. Sharp. Ills. 2000 w. El W—Sept. 16, 1916. Operating principles of a portable instrument.

Testing

Testing Plant Materials for Break-Down Voltage. (68717). H. A. Cozzens, Jr. Ills. 1500 w. El W—March 11, 1916. For checking up condition of rubber gloves, floor matting, and other appliances.

Turbo-Generator

La Transformation De L'Énergie Dans Un Turbo-Alternateur (73537 B). P. Normier. 4000 w. S I E—Sept. 10, 1916. Calculation of energy transformation in turbo-alternators.

Units

International System of Electric and Magnetic Units (74002). J. H. Dellinger. 30 pp. " S B S, Sci. paper 292—Oct. 11, 1916. Detailed discussion of this system and proposed changes.

Universal Switch

A Universal Switch for Thermoelement Work and Other Potential Measurements (69485 B). Ills. 3500 w. A JI S—April, 1916. For making measurements with potentiometers.

Voltage

Voltage Relations in Non-Symmetrical Lines (72710). R. C. Powell. 1000 w. El W—Aug. 26, 1916. Calculation of voltage variations.

Voltameters

Inclusions in the Silver Voltmeter Deposits (69451 N). G. W. Vinal and Will-

Voltmeters

Consult Classification of the Index. See page 7.

Voltmeters

iam M. Bovard. 25 pp. U S B S, Sci paper 271—March 24, 1916. Investigations.

Volume Effect in the Silver Voltmeter (72098). E. B. Rosa and G. W. Vinal. 11 pp. U S B S, Sci paper No. 283—July 10, 1916. Shows the effect is due to impurities of the electrolyte.

Summary of Experiments on the Silver Voltmeter at the Bureau of Standards and Proposed Specifications (73885). E. B. Rosa and G. W. Vinal. Ills. 36 pp. U S B S, Sci paper 285—Oct. 5, 1916. Summary of the work, with specifications proposed for international adoption.

Voltmeters

The Crest Voltmeter (67676 D). L. W. Chubb. Ills. 3000 w. A I E E, Pro—Feb., 1916. Methods of high voltage measurement.

Crest Voltmeters (67677 D). C. H. Sharp and E. D. Doyle. Diagrams. 1800 w. A I E E, Pro—Feb., 1916.

The Corona Voltmeter (71222 D). J. B. Whitehead and M. W. Pullen. Ills. 25 pp. A I E E, Pro—June, 1916. Instrument and tests.

Discussion on "Crest Voltmeters" (Sharp and Doyle), "The Crest Voltmeter" (Chubb), "The Voltmeter Coil in Testing Transformers" (Hendricks), "Notes on the Measurement of High Voltage" (Work), New York, Feb. 8, 1916 (71917 D). Ills. 20 pp. A I E E, Pro—July, 1916.

Watt-hour Meters

Watt-hour Meter Accuracy (68119 B). D. D. Ewing. With discussion. 2500 w. Ind Eng Soc—1915. Comparison of com-

POWER APPLICATIONS**Brick Making**

mission regulations with results got from tests.

Measuring Three-Phase Power by a Watt-Hour Meter (67650). A. L. Temple. Ills. 1200 w. Pwr—Feb. 1, 1916. Action of current and potential costs.

Wattmeters

A Method of Determining the Correctness of Polyphase Wattmeter Connections (67681 D). W. B. Kouwenhoven. 6000 w. A I E E, Pro—Feb., 1916. Reliable method for checking connections.

The Double Dynamometer Wattmeter (67660 A). C. V. Drysdale. Ills. 2500 w. Eln—Jan. 14, 1916. Serial, 1st part. Instruments in general; errors involved; new form of instrument.

Wattmeter Connections in Unbalanced Systems. (68425 A). Everett S. Lee. 700 w. G E R—March, 1916. Analysis of correctness of metering.

Wave-Lengths

An Abac for the Calculation of Wave-Lengths (66806 A). W. Eccles. 1000 w. Eln—Dec. 17, 1915. Oval abac; examples.

Waves

Measurement of Alternating Current Wave Form (68202 A). Ralph Brown. Ills. 4500 w. S J I E—Feb., 1916. Methods of importance.

Winding

Ueber einphasige Spulenwicklungen mit ungleicher Drahtzahl pro Nut (65475 B). K. Sachs. Ills. 2000 w. E u M—Oct. 24, 1915. Serial, 1st part. Mathematical development of principles of coil winding with varying numbers of wires to the slot.

POWER APPLICATIONS**A. C. Driving**

Alternating Current Driving in Factories (70347 A). 1600 w. Enr—April 28, 1916. Abstract of paper by G. H. Ayres, before Jun. Inst. of Engrs. Various methods and applications.

Agriculture

Electricity in Agriculture: Its National Aspects (66630 A). 2000 w. El R—Dec. 3, 1915. Views of different writers.

Electricity in Rural Communities (68580). W. R. Sammons. Ills. 5000 w. El R & W E—March 4, 1916. Farm applications.

The Application of Electricity to Agricultural Purposes (71709 A). W. T. Kerr. Abstract, with discussion. 3000 w. Eln—June 23, 1916. Emphasizes the importance of the agricultural load.

See also Farm Tractors under MECHANICAL ENGINEERING, *Combustion Motors*.

Alternating Current

Alternating-Current Service for an Office Building (73611). Charles Klapper. Ills. 1800 w. El W—Sept. 30, 1916. Substation arrangements, power, lighting and heating requirements, etc.

Bells

Bell Troubles (66929). H. M. Phillips. 1200 w. N E—Jan., 1916. Serial, 1st Part. Faults and remedies.

Bookbinding

Flexible-Plant Operation in a New York Bindery (68716). Ills. 1500 w. El W—March 11, 1916. Portable individual motor-driven units.

Brick Making

Electricity in Brick Manufacturing Plants (67146). Ills. 2500 w. El R &

Consult Classification of the Index. See page 7.

Canada

POWER APPLICATIONS

Electric Piano

W E—Jan. 8, 1916. Process and operating data.

Canada

Electric Power in Canadian Industry (65916 A). Charles H. Mitchell. Abstract of paper before the Int. Engng. Cong. 4000 w. Elect'n, Lond—Nov. 12, 1915. Study of the use and distribution.

Cement Mills

Electrification of Portland Cement Plants (73782). Ills. 2500 w. El R & W E—Oct. 7, 1916. Advantages of electric motor drive.

Cement Plants

Electricity in Current Manufacturing Plants (72092). Arthur C. Hewitt. Ills. 4500 w. El R & W E—July 29, 1916.

Coal Handling

Electrically - Driven Coal - Handling Plant (73482 A). H. H. Broughton. Ills. 3500 w. Eln—Sept. 15, 1916. Machinery and appliances for economical handling.

Coal Mining

Use of Electricity in Coal-Mining Operations (71969). Ills. 4000 w. El R & W E—July 22, 1916. Advantages and applicability.

Coal Refining

Electricity in a Coal-Refining Plant (68392). Frank D. Burr. Ills. 1000 w. El R & W E—Feb. 26, 1916. Data.

Coke Manufacture

Electricity in By-Product Coke Manufacture (69229). Ills. 2000 w. El R & W E—April 1, 1916. Plant utilizes waste gases for generating electricity.

Control

A System of Remote Control for an Electric Testing Laboratory (74029). P. G. Agnew, W. H. Stannard, and J. L. Fearing. Ills. 16 pp. U S B S, Sci paper 291—Oct. 12, 1916. Apparatus in use in laboratory of the Bureau of Standards for testing electrical instruments. General outline of systems.

Cooking

Discussion on "Economic Operation of Electric Ovens." Deer Park, Md., July 2, 1915 (67482 D). 1200 w. A I E E, Pro—Jan., 1916. Percy Wilcox Gumaer's paper.

Establishing the Electric Range in the Far West (69824). Ills. 2000 w. El W—April 22, 1916. Selling methods; rate schedules; metering practices.

The Electric Cooker in India (70515 A). Charles S. Jeffrey. 1800 w. El R—May 5, 1916. Drawbacks to use.

Electric Ranges (70659). H. C. Hopkins. Ills. 900 w. El JI—June, 1916. Designs and advantages.

Cotton-seed Mills

Electricity in Cotton-Seed and Peanut Mills (70200). Ills. 2500 w. El R &

W E—May 6, 1916. Successful installations.

Cottrell Processes

Cottrell Processes of Electrical Precipitation (68405 N). Walter A. Schmidt. Ills. 7500 w. C M I, Trans—1915. Review of work carried on over a period of eight years.

Crane Plant

Electrical Construction at Crane Plant, Chicago (67501). Ills. 2000 w. El R & W E—Jan. 22, 1916. Details of a recent installation.

Cranes

See same heading under MECHANICAL ENGINEERING, *Transporting and Conveying*.

Domestic

Electricity in the Home (69904). S. J. Gates. Ills. 3000 w. Wis E—April, 1916. Various adaptations.

Domestic Uses

Domestic Uses of Electricity Around Boston (65326). Ills. 1500 w. Elec Wld—Oct. 30, 1915. Cooking, heating, refrigeration, and other applications.

Electrical Industries

The Census of Electrical Industries (73913). William M. Steuart. Abstract of paper before Am. Elec. Ry. Assn. 3000 w. El R JI—Oct. 14, 1916. Record of the Census Bureau and what it shows.

Electric Cooking

An Analysis of Electric Cooking (73886). H. O. Swoboda. 4000 w. El R & W E—Oct. 14, 1916. Serial, 1st part. The development, rates, and other data.

Einiges über den gegenwärtigen Stand der Technik der gebräuchlichsten Elektrischen Wärmapparate (74239 B). 2000 w. S E V Bul—Sept., 1916. Present status of electric heating and cooking apparatus.

Electric Furnaces

Service Requirements of the Electric Arc Furnace (69234). Harry Hollis. Ills. 1500 w. El W—April 1, 1916. Characteristics of load.

The Rennerfelt Electric Arc Furnace (69666 N). C. H. Vom Baur. Ills. 8 pp. A El S—April, 1916. Description.

Electric Heating

Electrical Water Heating in the Household (73591 A). J. L. Shroyer. Ills. 3500 w. G E R—Oct., 1916. Results of an investigation of various methods.

Industrial Electric Heating (73807 A). C. F. Hirshfeld. Abstract of lecture at Cornell Univ. 2500 w. S JI E—Sept., 1916. Where successful and economical.

Electric Piano

Piano with Electrically-Sustained Notes (73221 A). Ills. 1200 w. Eng—

Consult Classification of the Index. See page 7.

Electromagnets

Sept. 1, 1916. Device invented by Messrs. Martre and Martin, and described in paper by H. Bevierre, before the French Soc. of Civ. Engrs.

Electromagnets

The Electromagnet (69425 A). Charles R. Underhill. Ills. 1000 w. S JI E—April, 1916. Details of design.

Electromagnets for Direct Current Circuits (69220). Norman G. Meade. Ills. 1400 w. N E—April, 1916. General characteristics; types.

Electro-Metallurgy

Electrometallurgical Industries as Possible Consumers of Electric Power (66424 D). 2500 w. A I M E Bul—Dec., 1915. Discussion of paper by Dorsey A. Lyon and Robert M. Keeney.

Elevators

Wait Turbo-Generator on Elevator Load (65910). Ills. 1800 w. Power—Nov. 23, 1915. Specially designed to carry six elevators and numerous tungsten lamps simultaneously.

Enameling

Electrically Heated Enameling Ovens (66058 A). C. W. Bartlett. Ills. 2500 w. G E R—Dtc., 1915. Types.

The Application of Electricity to Enameling or Japanning (70657). Wirt S. Scott. Ills. 1000 w. El JI—June, 1916. Advantages of the electric oven for this work.

Explosives

Electricity in the Manufacture of Explosives (71661). Ills. 5500 w. El R & W E—July 8, 1916. Processes involved.

Factories

Electric Service for Crane Company's New Works (69823). Ills. 2500 w. El W—April 22, 1916.

Electricity in Boiler and Radiator Manufacture (71274). Ills. 2000 w. El R & W E—June 24, 1916. Work at Eastwood, N. Y.

Fans

Mechanically-Operated Gyrator Fans (70658). E. E. Garlits. Ills. 1000 w. El JI—June, 1916. Types.

Farm Power

Water Power for the Farm (72489). Ills. 1500 w. El A—Aug., 1916. Types of dams, measuring stream flow, voltages, regulation, etc.

Flour Mills

Electric Drive in Flour Mills and Similar Industries (65346). T. E. Simpers. Ills. 2500 w. Elec Jour—Nov., 1915. Type and characteristics of motor required.

Foundries

Discussion on "Industrial Control in the Foundry" (McLain), Pittsburgh, Pa.,

POWER APPLICATIONS**Heating**

April 15, 1915 (66667 D). 6500 w. A I E—Dec., 1915.

Use of Electricity in Iron Foundries (71659). Ills. 1500 w. El R & W E—July 8, 1916. Installation of two typical establishments.

Freight Terminals

The Possibilities Open to the Central Station in Solving the Freight Terminal Problem (66060 A). Jas. A. Jackson. 1500 w. G E R—Dec., 1915. Adaptation of the electric motor.

Fuel Economy

Fuel Economy on the North-East Coast as a Result of Electric Power Supply (74096 A). R. P. Sloan. Read before British Assn. 2800 w. Mch E—Oct. 18, 1916. Account of industries, showing the great economy effected.

Future Development

Future Possibilities of Electricity (66114). Carl Hering. 2500 w. S A—Dec. 4, 1915. Applications awaiting development.

Garages

Electric Motors in Garages and Automobile Service Stations (66963). Bernard Lester. Ills. 1200 w. El JI—Jan., 1916. Rapid and efficient repair work.

Gas Comparison

Gas and Electricity for Motive Power (67333 A). W. A. Tookey. 1400 w. S M C E—Dec. 31, 1915. Costs.

Gear Making

Electricity in the Manufacture of Gears (67500). Ills. 3500 w. El R & W E—Jan. 22, 1916. Motor drive in two large plants; tabulated data.

Electricity in the Manufacture of Gears (69968). Ills. 1600 w. El R & W E—April 29, 1916. Process and machines used.

Haulage

Centrally Controlled Electric Haulage Systems (65749 B). F. E. Woodford. Also discussion. Ills. 7000 w. Engrs' Soc of W Penn, Pro—Oct., 1915. General description.

Heating

La crisi del carbone ed il riscaldamento elettrico (65427 B). Elvio Soleri. 1500 w. Indus—Oct. 10, 1915. Field for electrical heating in Italy in view of high coal prices.

Electric Heating and Schoop's Metal Squirting Process (66679 A). Dr. Lach. Abstract from *Elektro. Zeit.* 1000 w. Eln—Dec. 10, 1915. Details of process.

Electric Heating: Its Present Position and Future Development (67229 A). George Wilkinson. Abstract of paper before Inst. of Elec. Engrs., at Edinburgh. Ills. Also discussion. 2500 w. Eln—

Hoisting

Dec. 24, 1915. Advantages of thermostatically controlled heaters.

Electric Heating for a Large High School (67352). Ills. 1000 w. H & V M—Jan., 1916. Details of plant at Burley, Idaho.

Electric Heating: Its Present Position and Future Development (67656 A). George Wilkinson. Also discussion. Ills. 13 pp. I E E JI—Jan., 1916. Apparatus for automatic temperature control.

Discussion on "Electric Heating: Its Present Position and Future Development" (71849) N. 3500 w. I E E, JI—June, 1916. G. Wilkinson's paper.

État Actuel Du Chauffage Électrique (73538 B). Ills. 3900 w. I E I—Sept. 10, 1916. Present status and future development of electric heating.

Hoisting

Discussion on "Control of Direct-Current Hoists in Iron and Steel Mills" (Stoltz and Lum), and "Direct Current Control for Hoisting Equipment in Industrial Plants (Snyder), Pittsburgh, Pa., April 16, 1915 (66664 D). 10000 w. A I E E—Dec., 1915.

Hotel Equipment

Electrical Features of a Modern Hotel (68043). Ills. 2500 w. E I R & W E—Feb. 12, 1916. Hotel Vancouver, Vancouver, B. C.

The Electrical Equipment of the New William Penn Hotel (70655). J. Irvin Alexander. Ills. 4000 w. E I JI—June, 1916. Interesting electrical features of a Pittsburgh hotel.

Hot Water

Electric Hot Water Supplies (71713 A). H. H. Holmes. 2500 w. E I N—June 23, 1916. Early and recent types of apparatus.

Ice Harvesting

Electricity in Ice Harvesting (66130). Ills. 1500 w. E I R & W E—Dec. 4, 1915. Installation in New England.

Ice-Making

Electricity in Raw-Water Ice-making (70502). C. J. Carlsen. Ills. 4500 w. E I R & W E—May 26, 1916. Data on operation of typical plants purchasing power.

Implement Manufacture

Electricity in Harvesting Machine Works (65710). Ills. 3300 w. Elec Rev & W Elect'n—Nov. 13, 1915. The plant of the International Harvester Works.

Industrial

Discussion on "Field of Motor Application" (Rushmore), and "Electricity in Grain Elevators" (Stafford), Deer Park, Md., June 29, 1915. (66669 D). 22500 w. A I E E—Dec., 1915.

POWER APPLICATIONS**Mill Drive**

Industrial Applications of Electricity (68887 N). Philip Torchio. Ills. 168 pp. Pan-Am Sci Cong—1915-16. Highly inclusive.

The Inherent Economic Advantages of Electric Power (70691 A). Charles P. Steinmetz. 1800 w. G E R—June, 1916. Characteristics; past and present tendencies.

Industrial Motors

How to Select Industrial Motors (70604 A). Thomas Robson Hay. Ills. 3000 w. E M—June, 1916. Points to be observed in selection of types available for proposed work.

Knife Manufacture

Electricity in the Manufacture of the Pocket Knife (66978 A). F. A. Buttrick. Ills. 1500 w. G E R—Jan., 1916. Details of work and apparatus used.

Leather Making

Electricity in Leather Manufacturing (68992). Ills. 2000 w. E I R & W E—March 18, 1916. Processes; typical installations.

Machine Tools

Electric Operation and Automatic Electric Control for Machine Tools (66569 N). L. C. Brooks. Ills. 5000 w. A S M E—Dec., 1915. Advantages; starters; important factors.

Electric Operation and Automatic Electric Control for Machine Tools (67867 A). L. C. Brooks. Ills. Also discussion. 8500 w. A S M E, JI—Feb., 1916. Advantages; types.

Magnets

Lifting Magnets (72610 A). Ills. 3000 w. E I N—Aug. 11, 1916. Operating costs and performance; types; method of control, etc.

Maintenance

Electrical Maintenance Methods in a Great Office Building (67504). Ills. 1500 w. E I W—Jan. 22, 1916. Methods in Equitable Building, N. Y. City.

Manufacturing

Electricity in the Manufacture of Engines (71553). Ills. 4500 w. E I R & W E—July 1, 1916. Advantages and economy.

Marble Plants

Electrical Equipment of the Vermont Marble Company (65353 A). John Linton. Ills. 3500 w. Gen Elec Rev—Nov., 1915. Outlines the operating conditions.

Mill Drive

Layout and Tests of an Alabama Cotton Mill (74066). George Wrigley. Ills. 1500 w. E I W—Oct. 21, 1916. Arrangements for changing from electrical to mechanical drive in emergencies.

Consult Classification of the Index. See page 7.

Mining**POWER APPLICATIONS****Schools****Mining**

Line and Substation Construction to Serve Mines (69377). Richard Percy Hines. Ills. 800 w. El W—April 8, 1916. To serve W. Va. coal mines.

Surface Mining Electrical Plant (70740 A). Ills. 1000 w. El R—May 12, 1916. Detailed description of plant.

Electrical Distribution and Application in Mines (71808). H. M. Warren. Ills. 3000 w. Cl A—July 15, 1916. Serial, 1st part. D. C. and A. C. in anthracite region.

See also Hoisting, under MINING AND METALLURGY, *Mine Operation*.

Motor Applications

Factors Involved in Motor Application (65897 D). 80 pp. Am Inst Elec Engrs, Pro—Nov., 1915. Discussion at Cleveland, O., March 19, 1915. of David B. Rushmore's paper.

The Characteristics of Electric Motors Involved in Their Application (65898 D). Ills. 56 pp. Am Inst Elec Engrs, Pro—Nov., 1915. Discussion at New York, Feb. 17, 1915, of David B. Rushmore's paper.

Ore Reduction

Electric Power in Gold-Ore Reduction (67855). Ills. 1500 w. El R & W E—Feb. 5, 1916. Installation at Colorado Springs, Colo.

Ovens

Der elektrische Kachelofen (System Schoop) (67044 B). D. Korda. Ills. 2500 w. E Z—Nov.-Dec., 1915. Design of electrically heated ovens covered by Schoop process.

Paint Making

Electricity in Paint Manufacturing (67285). Ills. 2000 w. El R & W E—Jan. 15, 1916. Advantages of electric drive; typical installation.

Paper Mill

Electrically Driven Paper Mill (70686). Thomas Wilson. Ills. 3000 w. Pwr—May 30, 1916. Comparison of two plants, one mechanically and the other electrically driven.

Peanut Mills

See Cotton-Seed Mills.

Piers

See same heading under CIVIL ENGINEERING, *Construction*.

Precipitation

Electrical Precipitation—Theory of the Removal of Suspended Matters from Fluids, (Strong); Electrical Precipitation, (Nesbit); and Practical Application of Electrical Precipitation, (Bradley) (65893 D). 3000 w. Am Inst Elec Engrs, Pro—Nov., 1915. Three papers discussed together at New York, Feb. 19, 1915.

Electrical Precipitation of Smoke and Dust (70370). Halbert P. Hill. Ills. 1600 w. El W—May 13, 1916. Experiments with various materials in suspension.

Printing

The Electric Motor in the Printing Industry (66059 A). W. C. Yates. Ills. 4500 w. G E R—Dec., 1915. Advantages.

Publishing Plant

Electrical Features of a Publishing Plant (69407). Ills. 800 w. El R & W E—April 8, 1916. Installation for *Youth's Companion*, Boston.

Pumping

Electric Drive Replaces Steam for Drainage Pumps (70374). E. J. Hegerty. Ills. 1500 w. E R—May 13, 1916. Two speeds; at Illinois plant.

Pump Works

Electricity in Pump Manufacture (66374). Ills. 2000 w. El R & W E—Dec. 11, 1915. Data on two typical installations.

Quarrying

Electricity in Marble Quarrying (66028). Ills. 2000 w. Elec Rev & W Elect'n—Nov. 27, 1915. Installation of the Vermont Marble Co.

Electrical Equipment of the Alabama Marble Company (69200 A). R. T. Brooke. Ills. 800 w. G E R—April, 1916. Gradual change from steam.

Application of Central Station Power to Lime Plants and Quarries (71913). Roderick D. Donaldson. 4000 w. N L M A—May, 1916. Features of application and cost.

Electric Power in Slate Quarries (71834 A). G. K. Paton. Abstract of paper read before the Liverpool Eng. Soc. 3500 w. Qry—July, 1916. Serial, 1st part. Describes system of the power company, and details of quarry equipment.

Electric Power in a Marble Quarry (74095 A). Ills. 2500 w. Enr—Oct. 6, 1916. Equipment for use of hydro-electric quarry work in Vermont.

Railroad Machinery

Dynamo-Electric Machinery for Railroads (69410 A). Reginald Gordon. Ills. 1200 w. R M M—April, 1916. Generating and transforming units.

Sawmills

Sherry's Sawmill and Timber Works (69864 A). Ills. 1500 w. El R—April 7, 1916. Economy effected.

Schools

Electric Service for a City High School (66133). C. L. Vestal. Ills. 1200 w. El R & W E—Dec. 4, 1915. Carl Schurz school, Chicago.

Sewer Construction**Sewer Construction**

Electric Power in Sewer Construction (68582 A). Bayard W. Mendenhall. Ills. 1500 w. Mun E—March, 1916. Applications and methods.

Shoe Manufacturing

Electric Drive of the Shoe Manufacturing Industry (69112). Norman G. Meade. Ills. 1000 w. El W—March 25, 1916. Advantages.

Electricity in Shoe Manufacturing (68711). Ills. 1000 w. El R & W E—March 11, 1916. Advantages, especially electric heat.

Signaling

Electric Signalling with Bare Wires (73452 A). Sydney F. Walker. 2500 w. I & C T R—Sept. 8, 1916. Reviews report of Drs. Wheeler and Thornton.

Silk Manufacture

Electricity in the Manufacture of Silk (69562). Ills. 1000 w. El R & W E—April 15, 1916. Typical mill with data on number of plants.

Soap Manufacture

Electricity in Soap Manufacture (66751). Ills. 2000 w. El R & W E—Dec. 25, 1915. Processes and power applications.

Standardization

Standardization (73960 N). 30 np. A I S E E—May 20, 1916. Standardization Committee on the efficient application of electricity to the iron and steel industry.

Steel Mills

Electrical Practice in Steel Mills (65681). D. M. Petty, From a paper read at Detroit, before the Assn. of Iron & Steel Elec. Engrs. 1500 w. Ir Trd Rev—Nov. 11, 1915. Electrical equipment and its advantages.

Motor Drive for Steel Mills (69194 A). F. B. Crosby. Ill. 4500 w. G E R—April, 1916. Methods of speed control.

Latest Developments in New Apparatus and Appliances (71307 N). Ills. 9600 w. A I S E E—April 15, 1916. Expert talks by Electrical Development committees on generation, distribution and applications of electric power in iron and steel industry.

The Steel Mill and the Central Station (70704 A). K. A. Pauly. Ills. 2200 w. G E R—June, 1916. Power loads in steel mills.

TRANSFORMERS**Altitude Effect****Straggling Industries**

Electricity Supply Development in a Straggling Industrial Area (68620 A). Lewis W. Dixon. Ills. 700 w. El R—Feb. 18, 1916. What high-voltage transmission can do.

Textile Manufacture

Electricity in Cotton-Goods Manufacture (70360). Ills. 2500 w. El R & W E—May 13, 1916. Processes involved.

Electricity in Textile Mills (65323). H. A. Orr. From a paper before Nat. Elec. Lgt. Assn. Ills. 1500 w. Elec Rev & W Elect'n—Oct. 30, 1915. Arguments in favor of purchasing power.

Relative Value of Private and Purchased Electric Power for Textile Mills (66579 N). Frank W. Reynolds and Dan Adams. 18 pp. A S M E—Dec., 1915. Analysis and conclusions.

Electric Service in a Cotton-Duck Mill (67070). Ills. 1800 w. El W—Jan. 29, 1916. Power and lighting equipment of mill at Woodberry, Md.

Relative Value of Private and Purchased Electric Power for Textile Mills (68655 A). F. W. Reynolds and Dan Adams. 7500 w. A S M E, JI—March, 1916. Abstract, with discussion.

Tools

Small Electric Tools (74098 A). F. Ashton. 2500 w. Mch W—Oct. 13, 1916. Requirements and suggestions.

Water-Heaters

The Losses in Electrical Water-Heaters (68080 A). A. Rittershausen. Abstract from *Elek. Zeit.* 1500 w. Eln—Jan. 28, 1916. Due to construction and design. Best methods.

Water Heating

Electric Water Heating as Applied to Domestic Service (73289 A). C. W. Crosbie. Ills. 3000 W. Eln—Sept. 8, 1916. Some of the systems.

Wheel Slip

Chattering Wheel Slip in Electric Motive Power (67679 D). G. M. Eaton. Ills. 1200 w. A I E E, Pro—Feb., 1916. Causes, measuring and rectifying.

Woodworking

Electricity in Woodworking (70651). C. N. Johnson. Ills. 1500 w. El JI—June, 1916. Outlines advantages, problems, etc.

TRANSFORMERS**Abnormal Voltages**

Discussion on "Abnormal Voltages in Transformers" (Weed). San Francisco, Cal., Sept. 17, 1915 (69531 D). 1200 w. A I E E, Pro—April, 1916.

Altitude Effect

Effect of Barometric Pressure on Temperature Rise of Self-Cooled Stationary Induction Apparatus (69524 D). V. M. Montsinger. Ills. 5500 w. A I E E,

Consult Classification of the Index. See page 7.

Autotransformers

Pro—April, 1916. Correction for altitude.

Autotransformers

Autotransformers (68439). E. G. Reed. 700 w. El JI—March, 1916. Ratio and output rating; impedance.

Connections

The Open Delta Connection for Transformers (67629). J. B. Gibbs. Diagrams. 2000 w. El JI—Feb., 1916. Capacity; voltage drop.

Discussion on "Phenomena Accompanying Transmission with Some Types of Star Transformer Connections" (Robinson), San Francisco, Cal., Sept. 17, 1915 (68763 D). 1800 w. A I E E, Pro—March, 1916.

Discussion on "Delta-Cross Connection of Transformers" (Roux), San Francisco, Cal., Sept. 17, 1915 (69532 D). 900 w. A I E E, Pro—April, 1916.

Transformer Connections (69191 A). Eric A. Lof and Louis F. Blume. Diagrams. 8000 w. G E R—April, 1916. Serial, 1st part. Features; types.

Controlling Gear

Instrument Transformers (72071 A). Charles C. Garrard. Ills. 2500 w. Eln—July 14, 1916. Serial, 1st part. From a forthcoming book on "Electric Switch and Controlling Gear."

Design

The Mathematical Design of Transformers (67388 N). David Robertson. Ills. 8500 w. I E E—Jan. 1916. Data required; assumptions; symbols, and method.

Transformer Design (70017 A). F. M. Denton. 3500 w. Eln—April 14, 1916. Serial, 1st part. General discussion; outline of Arnold's methods.

The Mathematical Design of Transformers (73835 A). David Robertson. Abstract from JI. Inst. of Elec. Engrs. 2200 w. Eln—Sept. 29, 1916. Serial, 1st part. Details of method.

Efficiency

Transformer Efficiency and Regulation (69985). W. M. McConahey. 2200 w. El JI—May, 1916. Iron and copper losses analyzed.

Exciting Current

Effect of Exciting Current on the Economy of Operation of Distributing Transformers (67628). E. G. Reed. 500 w. El JI—Feb., 1916. Copper loss due to no-load transformer current.

Form Factor

Discussion on "Form Factor and its Significance" (Bedell, Bown, Pidgeon), "Distortion Factors" (Bedell, Bown, Swisher), and "An Analytical and Graphical Solution for Non-Sinusoidal Alternating Currents" (Mizushi), Deer Park, Md.,

TRANSFORMERS**Million-Volt**

June 29, 1915 (66674 D). Ills. 12000 w. A I E E—Dec., 1915.

High-Voltage

Experiments with High-Voltage Transformer (66900). C. H. Thordarson. Ills. 2000 w. El R & W E—Jan. 1, 1916. Results with aluminum coil, paper-insulated transformer.

Harmonics

The Predetermination of Higher Harmonics in the Alternating Current Transformer When the Impressed E. M. F. is a Simple Harmonic Function of the Time (71169 A). George R. Dean. 1000 w. Eln—June 9, 1916. Mathematical.

Large Systems

Modern Transformers for Use in Large Systems (70963 A). W. S. Moody. Ills. 2000 w. G E R—June, 1916. Features of design.

Losses

Eine neue Art zusätzlicher Verluste im Transformatorenkupfer (65404 B). M. Vidmar. Ills. 3500 w. E u M—Sept. 19, 1915. Explanation and quantitative investigation of a new sort of copper loss in transformers.

Wirbelstromverluste im Transformatorenkupfer (66255 B). M. Vidmar. Ills. 2800 w. E u M—Nov. 28, 1915. Serial, 1st part. Analysis of losses by eddy currents in transformer copper.

Stromverdrängung (Wirbelstromverluste) im Transformatorenkupfer (67053 B). F. Niethammer. Ills. 1000 w. E u M—Dec. 19, 1915. Eddy losses in transformer copper.

Magnetizing Currents

Discussion on "Harmonies in Transformer Magnetizing Currents" (Peters), San Francisco, Cal., Sept. 17, 1915 (68762 D). 2500 w. A I E E, Pro—March, 1916.

Manhole Apparatus

Manhole Transformers for Underground Alternating-Current Distribution (65348). E. G. Reed. Ills. 1200 w. Elec Jour—Nov., 1915. Analysis.

Manufacture

Willem Smit & Co.'s Transformatoren-fabriek te Nijmegen (66200 B). Ths. Roskopf. Ills. 2000 w. Ing—Nov. 13, 1915. Smit transformer works.

Million-Volt

A Sixty-Cycle Million-Volt Transformer (67294). 1300 w. S A—Jan. 15, 1916. Employed in research work at San Francisco.

Design of Million-Volt Experiment at Transformer (68214). Guy L. Bayley. Ills. 1500 w. El W—Feb. 19, 1916. Construction and operation of type shown at Panama-Pacific Exposition.

Oils**TRANSMISSION AND DISTRIBUTION****Cables****Oils**

Insulating Oils (69846 N). Ills. 6000 w. I E E, JI—April 1, 1916. Tests of transformer oils.

Testing and Filtering of Transformer Oil (71130). E. P. Peck. Ills. 1500 w. El W—June 17, 1916. Methods.

Operation

Operating Characteristics of Current Transformers (69564). Mark L. Harned. Ills. 3000 w. El W—April 15, 1916. Requirements; tests; effect of conditions.

Phase Angle

Discussion on "Phase Angle of Current Transformers" and "Calibration of Current Transformers by Means of Mutual Inductances," Deer Park, Md., July 2, 1915 (67483 D). 5500 w. A I E E, Pro—Jan., 1916. Papers by Chester L. Dawes and by Charles Fortescue.

Polarity

Polarity of Transformers (71684). W. M. Dann. Ills. 3000 w. El JI—July, 1916. Kinds of polarity, and distinctive features of each.

Protection

Protection of Distributing Transformers from Lightning (70654). Q. A. Bracl ett. Ills. 1200 w. El JI—June, 1916. Types of lightning arresters.

Rectifiers

The Hot Cathode Argon Gas Filled Rectifier (69195 A). G. Stanley Meikle. Ills. 2500 w. G E R—April, 1916. Types.

Selection

Factors in the Selection of Transformers (72302 N). A. C. Rayment. 2000 w. Cw E—July 1, 1916. Deals with points of construction.

Standardization

The Commercial Standardization of Instrument Transformers (67150). Otto A. Knopp. Ills. 700 w. El W—Jan. 8, 1916. Establishing independent current-ratio standard without laboratory facilities.

Stresses

Mechanical Stresses in Transformers (66309). J. F. Peters. Ills. 2000 w. El JI—Dec., 1915. Caused by stray magnetic fields that pass through windings.

Tests

Sur une méthode d'essai des transformateurs de mesure de tension (71321 D). M. Ilivici. 34 pp. Charts. S I E—April, 1916. Methods for testing transformers by measuring voltage. Theoretical and experimental study.

Transil Oil

Removing Moisture from Transil Oil (72491). Kennedy G. Rockworth. 1800 w. El A—Aug., 1916. Effect of moisture, methods of testing, drying, care, etc.

Voltage

The Problem of Voltage Transformation (70517A). Dr. F. Schröter. Abstract from *Elek. Zeit.* 1800 w. El n—May 5, 1916. Principles of working low-voltage installations.

Windings

Some Thermal and Mechanical Features of Transformer Windings (69264). W. M. McConahey. Ills. 2500 w. El JI—April, 1916. Methods.

Wiring

Transformer Wiring Practice (66901). Terrell Croft. Ills. 3000 w. El R & W E—Jan. 1, 1916. Methods and precautions.

TRANSMISSION AND DISTRIBUTION**Busbars**

Busbar Data for Outdoor Switching Structures (67149). C. A. Mees. 1500 w. El W—Jan. 8, 1916. Structural and electrical characteristics of materials, using data in designing.

Cable Joints

The Construction of High-Tension Cable Joints (69565). Philip Torchio. Ills. 1800 w. El W—April 15, 1916. Methods of N. Y. Edison Co.

Cable Numbering

System for Numbering Feeders and Cables (69941). Ills. 1500 w. El W—April 29, 1916. Methods of Brooklyn Edison Company.

Cables

The Effect of Moisture in the Earth on Temperature of Underground Cables

(65890 D). 2200 w. Am Inst Elec Engrs, Pro—Nov., 1915. Discussion of New York, Feb. 17, 1915, of L. E. Im-lay's paper.

Notes on Faults in Cables (65627 A). E. P. Austin. 1000 w. Elec Rev, Lond—Oct. 22, 1915. Investigates causes of inaccurate location tests.

Cable Suitable for Industrial Plant Subway System (66749). H. D. Austin. 1200 w. El W—Dec. 25, 1915. Comparison of rubber, cambric and paper insulation.

Economizing in Duct Space by Use of Sector Cable (68216). Ills. 2000 w. El W—Feb. 19, 1916. Comparing with round-conductor cable.

The Testing of Underground Cables With Continuous Current (68102 N). O.

Consult Classification of the Index. See page 7.

Calculation

TRANSMISSION AND DISTRIBUTION

Earthing

L. Record. Ills. 7500 w. I E E. General discussion; advantages.

Three-Core Cables (70842 A). M. Höchstädter. Ills. 3500 w. Eln—May 19, 1916. Abstract from *Elek. Zeit.* Study of dielectric losses.

De Kabelfabriek te Delft (71337 B). J. Lels and C. F. Proos. Ills. 4000 w. Ing—May 20, 1916. Cable factory at Delft.

Pulling-In Lead-Covered Underground Cables (71812). H. S. Percival. Ills. 2000 w. El R & W E—July 15, 1916. Present practice.

Recent Practice in the Manufacture, Laying and Jointing of 33,000-Volt 3-Phase Paper Insulated Underground Cables (71710 A). C. Beaver. 2000 w. Eln—June 23, 1916. Results obtained.

The Testing of Underground Cables with Continuous Current (71846 N). O. L. Record, with discussion. 30 pp. I E E, Jl—June, 1916. Object and methods.

Electric Light and Power Cables (73476 A). C. J. Beaver. 3000 w. Eln—Sept. 15 1916. Insulating materials used in early days, and the problems solved.

The Story of the Submarine Cable (73469 A). Charles Bright. Ills. 4000 w. Eln—Sept. 15, 1916. Summary of events in cable history.

Calculation

The Use of Hyperbolic Functions in the Calculation of a Long Distance Transmission Line (69427 A). C. R. Reid. 1300 w. S J I E—April, 1916.

Carbon Tetrachloride

Sulla Sostituzione Del Tetracloruro Di Carbonio All' Olio Negli Interruttori Ad Alta Tensione (74230 B). 1100 w. Ind—Oct. 1, 1916. Effect of carbon tetrachloride used for high voltage switches.

Circuit Breakers

Concrete Cells for Circuit Breakers and Busbars (71127). C. H. Sanderson. Ills. 1500 w. El W—June 17, 1916. Electrical layout that minimizes investment.

Oil Circuit Breakers and Their Application (72191). J. B. McNeill. Ills. 3000 w. El Jl—Aug., 1916. Electrical qualifications of a good oil circuit breaker, theory, operation, etc.

Circuits

Analysis of Frequency in Oscillatory Circuits (72557). G. W. O. Howe. Diagrams. 1800 w. El W—Aug. 19, 1916. New method of determining the frequencies and coupling co-efficients.

Single-Phase, Two-Phase and Three-Phase Distribution (72197). George P. Roux. 2500 w. El Jl—Aug., 1916. Study of conductors for each of the three.

Concentric Wiring

The History and Purpose of Concentric Wiring (67859). 2500 w. El W—Feb. 5, 1916. Abstract of address by R. S. Hale before Western Association of Electrical Inspectors, Chicago.

Conductors

Size of Electrical Conductors (65396). H. M. Phillips. 2000 w. Natl Engr—Nov., 1915. Serial, 1st part. First considerations. Factors of safety.

Iron and Steel Wire for Transmission Conductors (70702 A). T. A. Worcester. 1500 w. G E R—June, 1916. Relationship between electrical characteristics of copper and iron wire.

Kupferersatz für Freileitung (71333 B). A. Burri and Dr. Wyssling. 8500 w. S E V Bul—May, 1916. Copper substitutes—iron and aluminum—for overhead transmission lines.

Die Verwendung von Aluminium für Freileitungen (72119). Dr. Wyssling. 5000 w. S E V Bul—June, 1916. The use of aluminum for overhead conductors.

Economia Di Rame Ed Utilizzazione Di Conduttori Di Ferro Nelle Linee Elettriche (72786 B). Ills. 2100 w. Ind—July 23, 1916. Comparative economy of copper and iron for conductors of electricity.

Steel Conductors for Transmission Lines (72383 D). H. B. Dwight. 12 pp. A I E E, Pro—Aug., 1916. Advantages and disadvantages.

The Mechanical Problem of Electric-Power Transmission-Line Conductors (73147 N). Arthur Thomas Arnall. 1500 w. I C E, Paper No. 4144—1916. Considers conductors of large spans.

Characteristics of Iron and Steel Conductors (73918). Charles E. Oakes and Winfield Eckley. 1800 w. El W—Oct. 14, 1916. Results of tests showing comparative suitability of different stranded iron and steel wires.

See also Iron Wire, under *Measurement*.

Connections

Jitney Busses (72880 A). George P. Roux. Ills. 900 w. G E R—Sept., 1916. Scheme devised to simplify connections to a high-tension polyphase overhead line.

Polyphase Couplings (73159 N). Frank Ellis. Diagrams. 1200 w. Cw E—Aug., 1916. Explains principles involved and their applications.

Earthing

Earthing Electrical Systems to Water Pipes (69067 N). Burton McCollum and O. S. Peters. 23 pp. A W A, Jl—March, 1916. General treatment.

Consult Classification of the Index. See page 7.

Economics

An Automatic Earthing Protective Device (73213 A). Paul Thieme. 1600 w. Diagram. Eln—Sept. 1, 1916. Abstract from *Elektro Zeit*. Details of apparatus for a three-phase network.

Economics

Electric Power Transmission Economics (73593 A). George P. Roux. 4500 w. G E R—Oct., 1916. Economy of operation, showing the impracticability of the Kelvin law.

Electrical Faults

Some Electrical Troubles and Their Remedies (73293 A). Thomas Anderson. Read before Assn. of Min. Elec. Engrs. 4000 w. Mch E—Sept. 8, 1916. Cases of electrical faults.

Electrical Energy

Transmission and Distribution Problems (72403). 4500 w. El R & W E—Aug. 5, 1916. Abstract of report and discussion before Ohio Elec. Ltg. Assn. Gives cost data on standard construction.

Electricity Supply

Electric Power Distribution (73710 A). Charles A. Merz. Read before British Assn. 2500 w. Eln—Sept. 22, 1916. Advantages and economies from correct electrical development.

Electric Waves

Theory of Electric Waves in Transmission Lines (66061 A). J. M. Weed. 3000 w. G E R—Dec., 1915. Serial, 1st part. Theoretical study.

Electrostatic Neutral

Electrostatic Neutral in the 2-Phase, 3-Wire System and Danger Under Operating Conditions (72204 A). D. H. Moore. Ills. 1200 w. G E R—Aug., 1916. Important data.

Faults

Locating Faults by the Drop-of-Potential Method (66029). H. S. Percival. 3000 w. Elec Rev & W Elect'n—Nov. 27, 1915. Theory and applications.

Fuel Economy

Fuel Economy on the North-East Coast as a Result of Electric Power Supply (73711 A). R. P. Sloan. 2500 w. Eln—Sept. 22, 1916. Explains conditions and shows the great economy effected.

Fuses

The Renaissance of the Low-Tension Fuse (69120 A). John A. Crabtree. Ills. 2000 w. El R—March 10, 1916. Serial, 1st part. Questions of design.

Schmelzsicherungen für Starkstrom (73524 B). G. Roth. Ills. 3000 w. S E V Bul—Aug., 1916. Fuses for large currents. European types.

Georgia-Carolina

Georgia-Carolina Company Transmission System (66002). Ills. 1500 w. Elec

TRANSMISSION AND DISTRIBUTION**High Voltages**

Wld—Nov. 27, 1915. Line, river-crossing structures; substation.

Grounding

Desirability and Method of Connecting Low-Voltage Secondary Electrical Circuits to Water Pipes—Effect on the Pipe System (66820). Burton McCollum and O. S. Peters. 6500 w. E & C—Dec. 29, 1915. Dangers and protection, earth connections, electrolysis, etc.

High Frequency

Discussion on "Theory of Parallel Grounded Wires and Production of High Frequency in Transmission Lines" (Creighton), Cleveland, Ohio, June 29, 1916 (74114 D). 1800 w. A I E E, Pro—Oct., 1916.

High Pressure

The Design of High-Pressure Distribution Systems (66676 N). J. R. Beard. Ills. 4000 w. I E E Jl—Dec., 1915. Problems and practice.

The Design of High-Pressure Distribution Systems (67658 N). 20 pp. I E E, Jl—Jan., 1916. Serial, 1st part. Discussion of Beard's paper.

The Design of High-Pressure Distribution Systems (69845 N). 6000 w. I E E, Jl—April 1, 1916. Continued discussion of Beard's paper.

Discussion on "The Design of High-Pressure Distribution Systems" (68790 N). 7000 w. I E E, Jl—March 1, 1916. Continued discussion of Beard's paper.

The Design of High-Pressure Distribution Systems (68345 N). 10 pp. I E E, Jl—Feb. 15, 1916. Discussion of Beard's paper.

High Tension

Service Branches from Extra High-Tension Circuits (70439 A). D. M. MacLeod, with discussion. (Abstract.) 2700 w. Eln—April 28, 1916. Question of efficient and economical mains.

Service Branches from Extra-High-Tension Circuits (71847 N). D. M. MacLeod, with discussion. Ills. 5500 w. I E E, Jl—June, 1916. Various methods of delivering a small supply, and the cost.

High Voltages

The Effect of High Continuous Voltages on Air, Oil, and Solid Insulations (71221 D). F. W. Peek, Jr. Ills. 18 pp. A I E E, Pro—June, 1916. Results of tests.

Methods for Working on Live High-Voltage Lines (70958). J. O. Hardin. Ills. 3000 w. El W—June 10, 1916. Arrangements and apparatus used.

Protection of High Voltage Distribution Systems by Isolating Transformers (71224 D). O. O. Rider. 600 w. A I E E, Pro—June, 1916. Practicability of localizing line disturbances.

Consult Classification of the Index. See page 7.

Hotels

TRANSMISSION AND DISTRIBUTION

Losses

The Production of High Potential Direct Currents (71184 A). Ills. 900 w. Enr—June 9, 1916. The system developed by the General Electric Co. of America.

Discussion on "The Effect of High Continuous Voltages on Air, Oil, and Solid Insulations." (Peek), Cleveland, Ohio, June 29, 1916 (74113 D). 3000 w. A I E E, Pro—Oct., 1916.

Hotels

Electrical Construction Features of Hotel Morrison, Chicago (67286). Ills. 3000 w. El W—Jan. 15, 1916. Wiring for light, power, and telephone and signaling.

Inductance

Inductance of Conductors at Close Spacings (71814). Francis B. Silsbee. 1000 w. El W—July 15, 1916. Measurements under actual cable conditions.

Inside Construction

Modern Electrical Inside Construction (67200). B. Gross. Ills. 2800 w. El A—Jan., 1916. Recent installations.

Inspection

Electrical Inspection in Factories (72006 A). 2000 w. C G—July 7, 1916. Appendix to memorandum, by Gilbert Scott Ram, on switchboards.

Insulator Failures

Insulator Failures Under Transient Voltages (72381 D). W. D. Peaslee. Ills. 8 pp. A I E E, Pro—Aug. 1916. Requirements of a successful insulator.

Insulators

Insulator Performance from Operating Viewpoint (65713). E. P. Peck. Ills. 2000 w. Elec Wld—Nov. 13, 1915. Insulator troubles and tests.

The Construction of Insulators Out of "Hard Paper" or "Pertinax" (65918 A). K. Fischer. Abstract from *Elektro. Zeit.* Ills. 2000 w. Elect'n, Lond—Nov. 12, 1915. A study of the most suitable shapes.

Extra High-Tension Insulators (66965 N). W. Wilson. Ills. 1800 w. Cw E—Dec., 1915. Their care.

Some Characteristics of Link Type Insulators (67551 A). L. R. Leonard. 600 w. U C J E—Dec., 1915. Results of recent tests at Univ. of Colo.

Les isolateurs de ligne (propositions pour leur unification) (69611 D). R. V. Picou. Ills. 39 pp. S I E, Bul—Feb., 1916. Proposal for standardization of line insulators.

Factors Determining the Safe Spark-Over Voltage of Insulators and Bushings for High Voltage Transmission Lines (70701 A). F. W. Peek, Jr. Curves. 1500 w. G E R—June, 1916. Factors

affecting. How wet or rain spark-over voltage varies with altitude.

A New Method of Grading Suspension Insulators (71227 D). R. H. Marvin. Ills. 1800 w. A I E E, Pro—June, 1916. Preliminary experiments.

Megger and Other Tests on Suspension Insulators (71225 D). F. L. Hunt. 1000 w. A I E E, Pro—June, 1916. Results of tests.

Iron Wire

Iron Wire for Distribution and Transmission Lines (69380). 4000 w. El W—April 8, 1916. Present practice; compilation.

The Variation of the Resistance of Iron Wires with the Temperature of Alternate Current Circuits (70441 A). W. Peukert. 800 w. Eln—April 28, 1916. Abstract trans. from *Elektro Zeit.* Tables of results. Curves.

Lightning Protection

Studies in Lightning Protection on 4000 Volt Circuits (71223 D). D. W. Roper. Ills. 39 pp. A I E E, Pro—June, 1916. Improvements.

Lightning Protection of 4000-Volt Circuits (71815). Ills. 2200 w. El W—July 15, 1916. Results of extensive investigation.

Line Disturbance

Line Disturbances Caused by Special Squirrel-Cage and Wound-Rotor Motors when Starting Elevators and Hoists (65900 D). 1500 w. Am Inst Elec Engrs, Pro—Nov., 1915. Discussion at Cleveland, Ohio, March 18, 1915, of J. C. Lincoln's paper.

Line Problems

Graphical Solution of Transmission Line Problems (72453). T. A. Wilkinson. Chart. 2500 w. El W—Aug. 12, 1916. Use of chart for determination of factors involved.

Line Protection

Protection of Feeder Lines (73598 A). F. Dubsky. 800 w. G E R—Oct., 1916. Analysis of operating conditions and of protective devices.

Lines

An Artificial Transmission Line with Adjustable Line Constants (72382 D). C. Edward Magnusson and S. R. Burbank. Ills. 12 pp. A I E E, Pro—Aug., 1916. Describes a line which can be readily adjusted.

Pole Lines of C. M. & St. P. Electrification (73780). Ills. 1800 w. El R & W E—Sept. 30, 1916. Comparative cost of wood poles and steel towers.

Losses

Zusätzliche Verluste durch Stromverdrängung in Wechselstromdurchflossenen

Consult Classification of the Index. See page 7.

New Haven R. R.

TRANSMISSION AND DISTRIBUTION

Relays

Leitern (69882 B). F. Niethammer. Ills. 2500 w. E u M—March 5, 1916. Losses in alternating-current conductors through current displacement.

Distribution-Loss Factors (73285). Terrell Croft. 2500 w. Pwr—Sept. 19, 1916. Losses involved in the transmission of electrical energy.

New Haven R.R.

Feeding Heavy Single-Phase Load from Three-Phase Units (66375). Ills. 1500 w. El W—Dec. 11, 1916. Serial, 1st part. United Electric Light & Power Co., N. Y. City, to serve N. Y., N. H. & H. R. R.

Office Buildings

Electric Service in Largest Office Building (67303). R. D. Ward. Ills. 2000 w. El W—Jan. 15, 1916. Methods of distributing energy in this New York building.

Oil Switches

Tests on Oil Switches (69011 A). Bruno Bauer. 3000 w. Eln—March 3, 1916. Theoretical investigation; conclusions.

Small Industrial Oil Switches (72347). Ills. 700 w. Pwr—Aug. 8, 1916. New line for starting and protecting three-phase induction motors up to 10 h. p.

Poles

Reinforced Concrete Poles (69416). W. L. Cadwallader. Ills. 3000 w. El A—April, 1916. Construction, cost, etc.

Poles and Crossarms (70649). W. K. Vanderpoel. Ills. 3500 w. El JI—June, 1916. Their preservative treatment and handling before installation.

Poles and Pole-Line Construction (74192). G. L. Lindsley. 2000 w. El R & W E—Oct. 28, 1916. Serial, 1st part. Suggestions from a paper before the Indiana Elec. Light Assn.

Pole Sockets

Ueber Stangensockel für Freileitungen (70186 B). A. Burri. Ills. 9 pp. Schweiz Elektro Ver Bul—Mar., 1916. Sockets for holding transmission poles, especially the Universal.

Protection

Automatic Protective Devices for Direct-Current Systems (70743 A). M. Rosebourne and F. A. Couse. Ills. 2500 w. Eln—May 12, 1916. Devices for cutting out faulty feeders.

Theory of Parallel rounded Wires and Production of High Frequencies in Transmission Lines (71231 D). E. E. F. Creighton. Ills. 40 pp. A I E E, Pro—June, 1916. Factors to be considered.

Rapport sur la protection des installations électriques contre les surtensions (72118). Ills. 8000 w. S E V Bul—June, 1916. Report on protection of electric installations for excess voltage.

Discussion on "Studies in Lightning Protection on 4000-Volt Circuits" (Roper), "Experience and Recent Developments in Central Station Protective Features" (Pollard-Lawson), "Protection of High-Voltage Distribution Systems by Isolating Transformers" (Rider), Cleveland, Ohio, June 28, 1916 (73370 D). 15 pp. A I E E, Pro—Sept., 1916. Important contributions.

Service Connections from Underground Mains (73247). E. B. Meyer. Ills. 1800 w. El W—Sept. 16, 1916. Requirements of meter and service protection founded on experience.

Reactances

Two versus Three Reactors for Current Limitation in Three-Phase Feeder Circuits (71495 A). F. H. Kierstead. 1500 w. G E R—July, 1916. Discussion based on economy.

Reactors

The Use of Current-Limiting Reactors (65813 D). W. M. Dann and H. H. Rudd. Ills. 2200 w. Ohio Soc Mech, Elec, & Steam Engrs, Jour—Vol. VIII. No. 1. Advantages.

The Application of Current-Limiting Reactors (70650). H. H. Rudd and W. M. Dann. Ills. 2500 w. El JI—June, 1916. Protection to apparatus, service, etc., rating, location, effect on regulation and cost.

Rectifiers

Electrolytic Alternating Current Rectifiers (73878 B). Adelno Gibson. Ills. 14 pp. U S Art, JI—Sept.-Oct., 1916. Practical device for emergency use.

Regulator

A 480 Point Testing Regulator (69988). E. E. Lehr. Ills. 1500 w. El JI—May, 1916. Step type regulator and its operation.

Automatically-Controlled Feeder Voltage Regulators (71682). E. E. Lehr and I. C. Minick. Ills. 1800 w. El JI—July, 1916. Designs of types.

Relays

A New Time Limit Overload Relay (73590 A). H. G. French. Ills. 1300 w. G E R—Oct., 1916. A new improved type.

Die neuere Praxis in Bau und in der Verwendung von Relais zum Schutz elektrischer Anlagen (70185 B). Emil Heusser. Ills. 16 pp. Schweiz Elektro Ver Bul—Feb., 1916. Recent developments in design and application of various types of relays to the protection of installations.

The Use of Protective Relays on Alternating-Current Systems (71683). L. S. Crichton. Ills. 8000 w. El JI—July, 1916. Application of relays to 3-phase systems.

Consult Classification of the Index. See page 7.

Report

TRANSMISSION AND DISTRIBUTION

Thury System

Report

Report of Transmission Committee. I. Data from Operating Plants on the Effect of Altitude on the Operating Temperature Rise of Electrical Apparatus. Percy H. Thomas. II. Experience with Grounded Neutral on High Tension Transmission Lines (71229 D). Ills. 29 pp. A I E E, Pro—June, 1916. Information.

Rural Distribution

Rural Development of Transmission Lines in Eastern Pennsylvania (67634 A). Joseph W. Price. Ills. 2500 w. G E R—Feb., 1916. Experience of two companies.

Service Problems

Electric Service Problems and Possibilities (71027 B). P. Junkersfeld, with discussion. Ills. 60 pp. E S W P, Pro—March, 1916. Demand, cost, possibilities, etc.

Short Circuits

Theoretical Investigation of Electric Transmission Systems under Short Circuit Conditions (65901 D). 6500 w. Am Inst Elec Engrs, Pro—Nov., 1915. Discussion at New York, Jan. 8, 1915, of I. W. Gross' paper.

Signaling

Electrical Signaling with Bare Wires (72614 A). R. V. Wheeler and W. M. Thornton. Abstract of report issued by Home Office. 4000 w. Eln—Aug. 11, 1916. Precautions necessary for safety.

Stations

Simplifications in Design of Outdoor Stations (69563). M. M. Samuels. Ills. 2000 w. El W—April 15, 1916.

Stevedores

Electric Stevedores Promote Freight Terminal Efficiency (72509). C. W. Squires, Jr. 2000 w. C V—Aug. 15, 1916. Industrial truck applications.

Storm Detectors

Le détecteur d'orages et son application dans l'exploitation des stations centrales (70142 B). Ills. 1500 w. Ind Elec—Apr. 25, 1916. Description of a storm detector and its use in central stations.

Strap Conductors

Calculation of Skin Effect in Strap Conductors (68714). H. B. Dwight. 500 w. El W—March 11, 1916.

Sub-Stations

A Compact Alternating-Current City Substation (67858). Ills. 2000 w. El W—Feb. 5, 1916. New 45th St. station, New York City.

The Equipment and Protection of Outdoor H.-T. Substations (68340 A). J. Lindley Thompson and S. Austin Stigant. Ills. 3500 w. Eln—Feb. 11, 1916. Types; details of equipment.

Switches

Electrical Switch Gear for Industrial Purposes (71179 A). 4000 w. Eng—June 9, 1916. Examples of switch-gear designed to meet stated conditions.

The Use of Carbon Tetrachloride (Benzinoform) with High-Tension Switches (72282 A). M. Vogelsang. Abstract from *Elektro Zeit.* 1300 w. Eln—July 21, 1916. Describes the properties and peculiarities of this fluid.

Switchgear

New Developments in Switchgear Control (72298 A). A. G. Collis. Ills. 3500 w. Enr—July 21, 1916. Serial, 1st part. Deals with standardization of switchgear and developments in protective apparatus.

Switzerland

Sui Modi Di Ottenere La Produzione E La Distribuzione Economica Dell' Energia Elettrica (74227 B). 1100 w. Ind—Oct. 1, 1916. Review of proposed generating systems in Switzerland and Germany.

Systems

Operation of an Ohio Interconnected System (70795). Ills. 3300 w. El W—June 3, 1916. Features of line construction. Methods used in securing load, etc.

A Method of Studying Edison Distribution Systems (72555). C. E. Bennett. Ills. 2500 w. El W—Aug. 19, 1916. Investigation to determine the most economical distribution.

Telephones

How a Transmission Company Prevented Telephone Troubles (66379). F. Maury Gillespie. 1000 w. El W—Dec. 11, 1915. Arrangements for overcoming difficulties.

Temperature Rise

Temperature Rise of Insulated Lead-Covered Cables (72385 D). Richard C. Powell. 25 pp. A I E E, Pro—Aug., 1916. Factors that determine the rating of a cable.

Testing

Testing for Grounds and Insulation Resistance (66132). Diagrams. 2800 w. El R & W E—Dec. 4, 1915. Types of detectors, methods, and examples.

Three-Wire System

Balancers on Three-Wire System (73677). H. M. Phillips. Ills. 1800 w. Pwr—Oct. 3, 1916. How the system can be obtained from one generator and a balancer set.

Thury System

The Thury System of Direct Current Transmission (65354 A). William Baum. Ills. 6000 w. Gen Elec Rev—Nov., 1915. Describes system and discusses advantages and disadvantages.

Consult Classification of the Index. See page 7.

Tower Lines

Tower Lines

Protecting Tower Lines from Sleet (66604). Forster Holmgren. 800 w. El W—Dec. 18, 1915. Recommendations for Sweden.

Towers

Discussion on "Foundations for Transmission Line Towers and Tower Erection" (Walls, Leeper, Michell, Downing, Conner), and "Four Years' Operating Experience on a High Tension Transmission Line" (Bang), Deer Park, Md., June 29, 1915 (66675 D). Ills. 3500 w. A I E E—Dec., 1915.

Underground

Underground Distribution Systems (72378 D). G. J. Newton. 15 pp. A I E E, Pro—Aug., 1916. Importance of properly designing for the service.

An Underground System for an Industrial Plant (66137). H. D. Austin. Ills. 2000 w. El W—Dec. 4, 1915. For distribution to group of factory buildings.

Voltage

Constant Voltage Operation of a High Voltage Transmission System (72355 N). L. A. Herdt and E. G. Burr. 5000 w. C S C E—March 18, 1915. General features, operation, values, etc.

Wire Splices

Mechanical Strength of Copper Wire Splices (72556). E. R. Shepard. Ills. 2000 w. El W—Aug. 19, 1916. Analysis of tests by Bureau of Standards.

Wiring

Outside Wiring (67147). Terrell Croft. Ills. 4000 w. El R & W E—Jan. 8, 1916. Suggestions.

Wiring for Series Lighting Circuits (68394). Terrell Croft. Ills. 2500 w.

MISCELLANY

Electrical Engineering

El R & W E—Feb. 26, 1916. Details.

Installation of Knob-and-Tube Wiring (69134). Terrell Croft. Ills. 1500 w.

El R & W E—March 25, 1916. Details.

Wiring of a Railroad Passenger Service Terminal (68712). Ills. 3500 w. El R & W E—March 11, 1916. B. and O. Chicago Terminal R. R.

Electrical Installation in a Large Modern Club House (69231). Ills. 3000 w. El R & W E—April 1, 1916. Power, lighting and signaling.

Modern Molding - Wiring Maxims (70361). Terrell Croft. Ills. 1500 w. El R & W E—May 13, 1916. Directions.

Rigid Conduit Wiring Hints (71024). Terrell Croft. Ills. 2500 w. P E, C—June 15, 1916. Serial. 1st part. Detailed information.

Wiring of Fixtures and Pendants (70957). Terrell Croft. Ills. 2000 w. El R & W E—June 10, 1916. Methods.

Direct-Current Wiring Tables (72587). Cecil P. Poole. 1200 w. Pwr—Aug. 22, 1916. How to use the tables for finding sizes of conductors.

Electrical Wiring of a Steamship Pier (72487). Benjamin Gross. Ills. 2000 w. El A—Aug., 1916. At Savannah, Ga.

Z Connection

Advantages of the Z Connection (65349). Alfred J. A. Peterson. Diagrams. 2000 w. Elec Jour—Nov., 1915. Use in protective circuits.

Zinc Wires

Influence of the War Upon Electric Wiring Practice in Germany (70215). 2000 w. El W—April 29, 1916. Notes on the use of zinc conductors and regulations covering the installations of electricity.

MISCELLANY

Australasia

Notes on Electrical Work in Australasia (69847 N). C. G. Calman. 3000 w. I E E, JI—April 1, 1916. Review.

Coating Paper

The Art of Coating Paper (73106 A). Ills. 3000 w. Enr—Aug. 25, 1916. Serial, 1st part. The production of art papers. Construction and working of the machinery and plant.

Construction

Raising Standards of Electrical Construction (71970). 3000 w. El R & W E—July 22, 1916. Special features of the new municipal electrical inspection department of Milwaukee.

Diagrams

Uniformity in Drawing Electrical Diagrams (69122 A). Gisbert Kapp. Ills.

Also editorial. 4500 w. Eln—March, 10, 1916. Advocates the use of certain symbols.

Electrical Code

Code Requirements of Electrical Apparatus (69561). 3000 w. El R & W E—April 15, 1916. Suggestions for small manufacturers.

Electrical Diagrams

Electrical Diagrams (70044 A). P. Rayner-Smith. Ills. 600 w. Eln—April 21, 1916. Comment on diagrams proposed by U. S. Patent Office.

Electrical Engineering

Some Notes on the Early Developments of Electrical Engineering (73467 A). R. E. Crompton. 2500 w. Eln—Sept. 15, 1916. Historical review of England.

Consult Classification of the Index. See page 7.

Electrical Industry

Metallurgy in Relation to Electrical Engineering (73487 A). Ills. 1000 w. Eln—Sept. 15, 1916. Importance of the metals in this field.

Electrical Industry

Milestones on the Path of Progress (73466 A). W. R. Cooper. 3500 w. Eln—Sept. 15, 1916. Historical review.

Mobilization of the Electrical Industry (72964). Ills. 3000 w. El W—Sept. 2, 1916. Great resources and forces of employees.

An Analysis of the Electrical Manufacturing Situation (73658). Guy E. Tripp. 4500 w. El JI—Oct., 1916. Address at Hot Springs, Va., convention. Brief historical review and effects of the European war demands.

Discussion of Present Conditions in the Electrical Industry (73657). E. W. Rice, Jr. 3000 w. El JI—Oct., 1916. Address at Hot Springs, Va., convention.

Electrical Trade

Commercial Preparedness for War Aftermath (71124). A. A. Gray and M. G. Lloyd. 3000 w. El R & W E—June 17, 1916. Possibilities of Russian trade.

Electricity

I. Thoughts in Connection with the Electrical System of Small Central Stations. Albert J. Goedjen. II. The Distribution of Electric Energy with Particular Reference to Small Properties. A. Hardgrave. III. The Management of a Public Utility in the Average American City. Adam Gschwendt. IV. The City Manager. Robert L. Fitzgerald (72135 B). 23 pp. W S E, JI—May, 1916.

Electric Service

Standards for Electric Service (72333 B). 250 pp. U S B S, Circ. 56—July 28, 1916. Survey of state and municipal regulations suggesting rules.

Inspection Records

System of Keeping Records of Current Work in Electrical Inspection Department (66600). 3200 w. El R & W E—Dec. 18, 1915. Serial, 1st part. Methods and forms.

Italy

Electricity in Italy (70107 A). F. E. M. Thrupp. 4000 w. Beama JI—Apr., 1916. Opportunities for trade.

MISCELLANY**Reviews of 1915**

One Year of Commercial Achievement (70507). Ills. 2200 w. El W—May 20, 1916. Reviews the past year.

Developments in the Electrical Industry During 1915 (66972 A). John Liston. Ills. 7000 w. G E R—Jan., 1916. Summary of year's progress.

Technical and Engineering Progress (66906). Ills. 12000 w. El W—Jan. 1, 1916. Reviews by prominent writers; tendencies in science and applied engineering.

The Year in the Electrical Industry (66897). 9500 w. El R & W E—Jan. 1, 1916. Steady growth rather than remarkable development.

Electrical Engineering in 1915 (67529 A). 4000 w. Enr—Jan. 7, 1916. Serial, 1st Part.

March of Electrical Progress in 1915 (67201). Theodore Dwight. 2000 w. El A—Jan., 1916. Applications of special interest.

Electrical Affairs in Great Britain in 1915 (66898). Albert H. Bridge. 1500 w. El R & W E—Jan. 1, 1916. Effects of war.

Standardization

Standardization (73368 D). C. le Maistre, with discussion. 6000 w. A I E E, Pro—Sept., 1916. Brief review.

Standardization Rules of the American Institute of Electrical Engineers (73371 D). 100 pp. A I E E, Pro—Sept., 1916.

United States

Choses aperçues au cours d'un rapide voyage à travers les États-Unis (69676 D). Sosnowski. Ills. 40 pp. S I E, Bul—March, 1916. Brief notes from trip of observation in the United States; stations, transmission, electrification.

Western Electric

Western Electric Developments in 1915 (66903). 2000 w. El R & W E—Jan. 1, 1916. Résumé of company's more important improvements.

Westinghouse

Westinghouse Electric Developments in 1915 (66904). 4500 w. El R & W E—Jan. 1, 1916. Progress.

INDUSTRIAL MANAGEMENT

EDUCATION	158	REGULATION	175
FINANCE AND COSTS	162	WELFARE AND SAFETY	178
MANAGEMENT	169	MISCELLANY	183

Applied Science

Applied Science

Technical Education for the Professions of Applied Science (65798 A). 5500 w. Worcester Poly Inst, Jour—Nov., 1915. Read at Int. Engng. Cong. Relates to the professional side of applied science.

Apprentices

How an Industry Trains Its Men (73570 A). Clarence O. Price. Ills. 3000 w. E M—Oct., 1916. Methods of the Atchison, Topeka & Santa Fe in educating apprentices.

Necessity of Apprenticeship (72907 N). 14 pp. Conf. Bd. on Training Apprentices, Bul. No. 1—May, 1916. Information on training of industrial workers.

Training of Apprentices (73489 A). A. P. M. Fleming. 4500 w. Eln—Sept. 15, 1916. English methods of training for every grade of engineering employment.

Apprenticeship

Training Mechanical Apprentices at the Norfolk Navy Yard (67098 A). N. E. Adamson, Jr. Ills. 2500 w. E M—Feb., 1916. Report of gratifying success.

Apprentices on the Southern Pacific (68030 A). Thomas G. Gray. 2200 w. R M E—Feb., 1916. Improved methods followed.

L'apprentissage professional (69609 B). Elie Bertrand. 13 pp. R G S—Mar. 15, 1916. Technical apprenticeship systems in France and Germany.

The Education of Youths Before and During Their Apprenticeship (69735 N). V. A. Mundella. 8000 w. N E C I E S, Trans—March, 1916. Principles to observe.

Training the Apprentice (69992 A). T. H. Alvord. 600 w. Mch—May, 1916. Importance of emphasizing the time element in shop work.

Educational Work of the Atchison, Topeka & Santa Fé Railway Co. (70104 A).

EDUCATION

Colleges

F. W. Thomas. 10 pp. Nat Assn Corp Schools Bul—May, 1916. What is being done.

Apprentice Systems, Westinghouse Air Brake Company (70760 A). C. H. Smith. 2000 w. N A C S—June, 1916. Educational activities for benefit of employees. Modern Apprenticeship Training (71690). H. L. Burrhus. 3000 w. R R—July 8, 1916. Practical considerations of instruction.

The Education of Youths before and during their Apprenticeship (72608 N). 70 pp. N E C I E S, Trans—July, 1916. Discussion on V. A. Mundella's paper.

Apprentice Systems (73962 N). Ills. 38 pp. A I S E E—June, 1916. M. W. Alexander explains work of General Electric Co. in effective training of men. Also John W. Hallock on work at University of Pittsburgh; and others.

Central-Station Training

Training Men for the Central Station Industry (65324). Ills. 2000 w. Elec Wld—Oct. 30, 1915. Serial, 1st part. Commonwealth Co. of Chicago.

Chemistry

Chemical Science and Chemical Industry (73126 A). Ira Remsen. 3500 w. M Rd—Sept. 14, 1916. Briefly reviews the work of noted chemists.

The Expanding Relations of Chemistry in America (73812B). Charles H. Herby. Presidential address. 4500 w. J I & E C—Oct., 1916. Relations to university administrations and the government.

Coal Mining

Teaching Coal Mining in Part-Time Schools (71724 A). 3000 w. C G—June 23, 1916. Outlines a scheme of instruction.

Colleges

Boston Tech Opens New Home (71268). Ills. 2500 w. E N—June 22, 1916. Account of opening celebration.

What Is a College For? (73343). 3000 w. E & C—Sept. 20, 1916. Reprinted

Consult Classification of the Index. See page 7.

College Training

from issue of Nov. 10, 1909. Quotation of an opinion by Woodrow Wilson.

College Training

Does Present-Day College Education Produce Accuracy and Thoroughness? (70209). 5500 w. E R—May 6, 1916. Discussion between George F. Swan and Daniel W. Mead.

Colliery Managers

Training of Colliery Managers (67247 A). Noah T. Williams. Read before the Nat. Assn. of Col. Mgrs. Also discussion. 3000 w. I & C T R—Dec. 24, 1915. Schemes of training.

Commercial Work

Relation of Personal Habits and Conduct to Success in Commercial Work (74073 A). Ralph B. Day. 2000 w. S. JI E—Oct., 1916. Suggestions for students.

Co-operation

Co-operation with the Metal Industries in Metallographic Work at the Hammond Laboratory of the Sheffield Scientific School, Yale University (72908 N). C. H. Mathewson. 20 pp. A I Mt—Sept., 1916. Plan now in force.

Co-Operative

Co-operative Education in Electric Railway Work (69559). A. M. Wilson. Ills. 4000 w. El R JI—April 15, 1916. At Cincinnati, O.

Co-ordinating University and Shop Work (73776). A. M. Wilson. Ills. 2000 w. El R & W E—Sept. 23, 1916. Outline of co-operative work between manufacturing industries and central stations in Cincinnati.

Co-Operative Courses

How Co-operative Courses Train Young Engineers (67262). H. A. Stringfellow. 1200 w. E N—Jan. 13, 1916. Experiences of part school and part practice methods installed in the University of Rochester.

Co-Operative Schools

Co-operative Technical Schools Meet Present Needs (66139). Fred E. Ayer. 1800 w. E N—Dec. 2, 1915. Benefits of alternating school and practical work.

Cripples

See same heading under *Welfare and Safety*.

La rééducation professionnelle des blessés et des mutilés de la guerre (70191 C + D). Jules Amar. Ills. 51 pp. R Met—Oct., 1916. Results of intensive study of educating and assisting wounded workmen.

Crystallography

Cultivating Stereoscopic Sight (74049). Walter M. Brodie. 1500 w. E & M J—Oct. 21, 1916. Method of adapting the human sight to produce

EDUCATION

stereoscopic vision, and its use in the study of crystallography.

Education

Du rôle des universités dans l'enseignement technique supérieur (72104). Paul Janet. 4200 w. R G S—June 30, 1916. The part of the University in the advancement of higher education.

Employees

Educating Workers for Higher Efficiency (66827 A). F. B. & L. M. Gilbreth. Ills. 2800 w. I A—Dec. 30, 1915. Methods.

Engineering

Engineering-Education Faults (66740). W. M. Wilson. 1800 w. E N—Dec. 23, 1915. Menace of over-specialization.

Broader Training for the Engineer (66445 B). Alexander C. Humphreys. First of two lectures at Brown University. 7500 w. S I—Oct., 1915. Responsibility as citizen; preparation needed.

By-Products of an Engineering Education (67542). Armin Elmendorf. 2200 w. W E—Jan., 1916. Broader outlook.

Broader Training for the Engineer (68927 B). Alexander C. Humphreys. 22 pp. S I—Jan., 1916. Second of two lectures at Brown University.

La formation de l'ingénieur (68856 C). Ernest Marceau. 10 pp. R T C—Feb., 1916. Making the engineer in school and after.

Engineering Schools and Industrial Methods (69952 A). H. L. Gantt. 3000 w. E M—May, 1916. Suggestions.

The Modern Engineer (71301 N). Lawrence Addicks. 1700 w. A El S—Apr. 27, 1916. Presidential address.

Die Ausbildung des Ingenieurs an der Eidgen. Technischen Hochschule (72818 B). A. Stodola. 1000 w. S B—Aug. 5, 1916. Qualities necessary to success.

Les Nécessités De L'Enseignement Technique Supérieur (72793 B). L. Zorretti. 3300 w. R G S—July 15, 1916. Requirements of technical education.

Engineering Education And Research In Relation To The Organization of British Engineering Industry (73511 A). 1100 w. Nt—Aug. 24, 1916. Recommendations of Manchester Engineers' Club.

The Engineer of the Future and His Education (66013 A). John R. Allen. Also discussion. 8000 w. Cleveland Engng Soc, Jour—Nov., 1915. Need of broad education.

Pirate Pills for Engineers (71348 A). Leonard M. Cox. 3000 w. E M—July, 1916. A semi-humorous paper.

Engineering Education in the United States (71061 A). Charles S. Howe, with discussion. 11500 w. C E S, JI—May, 1916. Development and requirements.

Engineering

Engineers' English**Engineers' English**

The English of Engineers (74000 A). J. M. Telleen. 15 pp. C E S JI—Sept., 1916. Criticism and suggestions, with general discussion.

Experiment Stations

Engineering Experiment Stations (69685 N). A. A. Potter. 5 pp. Soc Pro Eng Ed, Bul—Apr., 1916. Status and prospects.

Discussion on "The Engineering Experiment Station of the University of Illinois" (Paine), St. Louis, Mo., October 20, 1915 (69528 D). 2200 w. A I E E, Pro—April, 1916.

Foundry Work

Foundry Work at the University of Nebraska (72899 N). John Grennan. Ills. 11 pp. A F A—Sept., 1916. Describes the course of foundry study.

India

Technical Training in India (65787 A). 3300 w. Engr, Lond—Nov. 5, 1915. Critical discussion of methods.

Industrial Education

The Education of Youths Before and During Their Apprenticeship (68534 N). V. A. Mundolla. 7500 w. N E C I E S—Feb. 25, 1916. Necessity of compulsory education.

Education and Industrial Efficiency (65482 N). H. L. Gantt. 7 pp. Amer Econ Assoc. Discussion of paper by Edward D. Jones.

Industrial Hygiene

A Plan for Education in Industrial Hygiene and the Avoidance of Occupational Complaints (73988 A). J. W. Scherschewsky. 3000 w. A JI P H—Oct., 1916. Methods for securing results with workers.

Industrial Laboratories

Scientific and Economic Progress (68553 N). Walter Rautenstrauch. 5000 w. C U Q—March, 1916. Need of co-operation between industries and schools.

Industrial Service

Developing the Human Side in Industry (70592 A). Fred H. Rindge, Jr. 2000 w. I A—May 25, 1916. College movement of the Y. M. C. A.

Industrial Training

The Training of Engineering Foremen and Works Managers (70474 A). A. J. Liversedge. 1800 w. Mch W—May 5, 1916. Serial, 1st part.

How to Train Young Engineers as Managers (71346 A). Joseph W. Roe. 3300 w. E M—July, 1916. Outlines a definite course for collegiate work.

The Training of Our Captains of Industry (71262 A). Robert Hadfield. 1800 w. I & C T R—June 9, 1916. Need of training that will combine both scientific and practical ideas.

EDUCATION**Municipal School**

Some Improvements in Existing Training Systems (70943 D). J. W. Dietz. 2200 w. Annals Am Acad—May, 1916. Training plans and needed improvements.

Adopting Standards to Meet Trade Training Requirements (70936 D). E. G. Allen. 600 w. Annals Am Acad—May, 1916. Outlines standards established by Cass Technical High School.

What Manufacturers Look for in Engineering Graduates (72048 A). E. H. Fish. 3000 w. E M—Aug., 1916. More attention should be given to factors developing leadership.

The Industries and the Universities (70132 N). William H. Nichols. 10000 w. JI I & E C—May, 1916. Address before Am. Chem. Soc. With extensive discussion.

Laboratories

New Laboratories at Ottawa (69364). Ills. 800 w. Cn E—April 6, 1916. Ceramics and structural materials.

The National Physical Laboratory—Its Work and Aims (73499 N). Walter Rosenhain. Ills. 50 pp. W S I S I, JI—April, 1916. Account of its organization, equipment and work. Relation of science and industry.

Machine Design

Machine Design in a Rhode Island School (65677 A). W. E. Freeland. Ills. 1200 w. Ir Age—Nov. 11, 1915. Instruction at the R. I. School of Design.

Managers

The Importance of Leadership (69178 A). H. L. Gantt. 3000 w. E M—April, 1916. Principles of industrial development. Methods of training.

Military Academy

West Point (71060 A). P. S. Bond, with discussion. Ills. 11000 w. C E S, JI—May, 1916. Methods and ideals.

Mining

Some Conditions Affecting Education in Mining and Metallurgy (68156 N). J. C. Gwillim. 1500 w. C M I, Bul—Feb., 1916. Possible improvement.

The Influence of Technical Journalism on Mining Education (68132). T. A. Rickard. Read before the Pan-Am. Sci. Cong. 2500 w. M & S P—Feb. 12, 1916. Suggested development.

Motion Pictures

Industrial Application of Motion Pictures (73683 A). Ernest A. Dench. Ills. 5500 w. Mch—Oct., 1916. Details of effective applications to industrial development.

Municipal School

Municipal School for Street Cleaners (74144). C. L. Edholm. Ills. 3000 w. Mun JI—Oct. 26, 1916. How the N. Y. street cleaning department gives instruction to employees.

Naval Academy**Naval Academy**

Education at the U. S. Naval Academy (71075 B). Ridgely Hunt. 56 pp. U S N I, Pro—May-June, 1916. Critical discussion.

Naval Engineers

Post Graduate Education in Naval Engineering (68965 N). John Halligan, Jr. Ills. 3000 w. A S N E, JI—Feb., 1916. Scope of field; history of courses.

Polytechnic

The Nation, the Apprentice, and the Polytechnic (73488 A). R. Mullinedux Walmsley. 4000 w. Eln—Sept. 15, 1916. Work done since the war, and the problem to be faced when peace is declared.

Post-Graduate Schools

Engineering Post-Graduate Schools from the Student Standpoint (69456 B). E. E. Wilson. Also Comment by L. H. Chandler. 3800 w. U S N I, Pro—March-April, 1916. Need and methods.

Power Plant

Wentworth Institute Power Plant Course (72181). Charles L. Hubbard. 2500 w. Pwr—Aug. 1, 1916. A course in power plant operation.

Progress

What Has Engineering Education Contributed to Scientific Progress and Invention? (69684 N). V. Karapetoff. 18 pp. Soc Pro Eng Ed, Bul—Apr., 1916. General discussion.

Railway Work

Education for Railway Work (65709). Samuel O. Dunn. 3000 w. Ry Age Gaz—Nov. 12, 1915. Address at opening of Commerce School of Northwestern University, Chicago.

Research

Engineering and Scientific Research (70532 N). J. A. Fleming. 5500 w. S E—May 1, 1916. Needed improvements in training engineers; importance of co-ordination.

Engineering and Scientific Research (70520 A). J. A. Fleming, with discussion. (Abstract of paper read at Conference of Soc. of Engrs.) 5500 w. Eln—May 5, 1916.

The Application of Science in Factories (70531 A). 6500 w. Eng—May 5, 1916. Presidential address to the Iron & Steel Inst. Benefits and difficulties.

The Stages of Science (70527 A). 2500 w. Eng—May 5, 1916. Editorial review of papers by Beardmore and Fleming.

The Business Side of Science: Its Part in the Coming Economic Crisis (70262 N). T. C. Elder. 3500 w. N E C I E S—April 7, 1916. Relation of industry and science.

Suggestions for Electrical Research in Engineering Colleges (70421 D). V.

EDUCATION**Street-Railway Employees**

Karapetoff. 4500 w. A I E E, Pro—May, 1916. Topics suitable for thesis, research, and advanced study.

Research as a National Duty (70825 N). 4500 w. J I & E C—June, 1916. Importance of material research.

Research in Metallurgy (70859 A). 2200 w. Enr—May 19, 1916. Extracts from Sir Robert Hadfields' address on the "Metallurgy of Ferrous Metals."

Research Organization (71490 A). W. R. Whitney. Also editorial. 6000 w. G E R—July, 1916. Official activities as regards research work. Substance of the Newland's bill.

Technical Research (73479 A. J. Swinburne. 2500 w. Eln—Sept. 15, 1916. Special reference to England.

Discussion on "Suggestions for Electrical Research in Engineering Colleges" (Karapetoff), Cleveland, Ohio. June 30, 1916. (74115 D). 5000 w. A I M E Pro—Oct., 1916.

Engineering and Research (74225). 1900 w. T E S—Sept. 29, 1916. Abstract of report of committee of the Privy Council for Scientific and Industrial Research.

Scientific and Industrial Research (74203 B). 1500 w. Nt—Sept. 21, 1916. Abstract of report of Advisory Council in Great Britain.

The Relation of Pure Science to Industrial Research (74106 D). J. J. Carty. Presidential address. 10 pp. A I E E Pro—Oct., 1916. Relation between scientific and industrial research.

The Place of Science in Education (71737 A). J. A. Fleming. 4500 w. R S A, JI—June 23, 1916. Needed reform in primary education.

Shop Courses

Development of Engineering Shop Courses at Wisconsin (73966). A. L. Goddard. Ills. 3500 w. Wis E—Oct., 1916. Courses and requirements.

Shop Instruction

Shop Instruction at University of Illinois (69662 N). B. W. Benedict. Ills. 24 pp. Soc Pro Eng Educ, Bul—Nov., 1915. Methods and results.

Shop Schools

International Harvester Shops' Schools (71516 A). Clarence J. Hicks. 1600 w. N A C S—July, 1916. Training employees.

South America

Education in Central and South America (65435). 8 pp. Nat Assoc Corp Schools Bull—Nov., 1915. Review of present situation.

Street-Railway Employees

Motive Power Department's Part (66237). F. H. Miller. Ills. 2500 w.

Technical

Rose Tech—Dec., 1915. Instruction of Louisville motormen.

Technical

La réforme des enseignements scientifique et technique (69605 C + D). L. Lindet and Henry Le Chatelier. 7 pp. S E I N—Jan.-Feb., 1916. Suggestions as to improvements in scientific and technical teaching.

Sur l'organisation de l'enseignement supérieur technique dans les universités (69633 B). Paul Rivals. 4 pp. R G S—Mar. 30, 1916. Questions of higher technical instruction in universities.

Industrial Organization and the Technical Schools (73579 A). Dexter S. Kimball. 2500 w. E M—Oct., 1916. Instruction should not be confined.

Training

Can the Human Side of Engineering Be Taught? (74159 A). Fred H. Rindge Jr. Ills. 3000 w. E M—Nov., 1916. Ideals of the Industrial Service Movement and its active operations, with suggestion of course.

De Staatswetenschappen als ingenieursvak (74206 B). D. Van Blom. 2000 w. Ing—Sept. 16, 1916. The status of engineering graduates in Holland.

Training Men for Supervisory and Executive Positions (73910). L. C. Bradley.

FINANCE AND COSTS**Accounting**

Abstract of paper before Am Elec Ry Assn. 3500 w. El R JI—Oct. 14, 1916. Requirements and methods.

The Training of Young Men for Promotion (74152). F. W. Thomas. 5000 w. R A G—Oct. 27, 1916. Santa Fe plan.

Trade Instruction

The Making of a Skilled Mechanic (67113 B). Ills. 3000 w. I A—Jan. 6, 1916. Methods at Wentworth Institute, Boston.

Universities

The Universities and the Industries (67025 N). 7500 w. JI I E C—Jan., 1916. Series of addresses by MacLaurin, Talbot, Walker, Little.

Vocational

Vocational Education Survey of Richmond, Va. (69446 N). 325 pp. U S D L—No. 162.

Vocational Selection

Selecting Men for Jobs (70612 A). Hermon Schneider. 6500 w. E M—June, 1916. Studies and results at Cincinnati University.

Vocational Tests

The Use of Mental Tests in Vocational Guidance (70935 D). Guy Montrose Whipple. 3300 w. Annals Am Acad—May, 1916. General principles.

FINANCE AND COSTS**Accounting**

Navy Yard Accounting (65481 N). G. P. Auld. 21 pp. U S Naval Inst Pro—Sept.-Oct., 1915. Methods of keeping costs.

Accountancy, Economy and Efficiency in a City Department (67351 A). Harold D. Force. 2500 w. JI Act—Jan., 1916. Outline of work, and results.

Relation between the Accountant and the Efficiency Engineer (67921 A). C. E. Knoeppel. 4000 w. JI Act—Feb., 1916. Essential for harmony.

Cost Accounting by Machinery (68078 A). Ills. 1200 w. El R—Jan. 28, 1916. Chrono Cost-Accounting System. Replaces mental labor.

Industrial Accounting (70887 A). F. J. Knoeppel. 3000 w. JI Act—June, 1916. Descriptive outline.

Reasons for Excluding Interest from Cost (70886 A). George O. May. 3000 w. JI Act—June, 1916. Treatment of interest in industrial accounting.

Accounting System of New York Department of Water Supply (72215 A). L. E. Stander. 2500 w. JI Act—Aug., 1916. Main outlines of the system.

How to Use Sinking Funds (73438). W. H. Forse, Jr. 2500 w. El R JI—Sept. 23, 1916. Proper accounting treatment.

Simplified Freight Station Accounting (73059). Charles Hine. 1500 w. R A G—Sept. 8, 1916. Outlines an application of banking practices.

Two Examples of Foundry Cost Accounting (73029 A). W. E. Freeland. Forms. 2500 w. I A—Sept. 7, 1916. Methods devised to collect and record cost data.

Uniform System of Accounting for Cities of Third Class in New York (73319 A). Fred G. Reusswig. 5500 w. JI Act—Sept. 1916. Presents proposed plan.

Accounting and Modern Industry (73915). John R. Wildman. Abstract of paper before Am Elec Ry Acc Assn. 2000 w. El R JI—Oct. 14, 1916. How accounting can serve administration.

Accounting Inconsistencies and Fallacies (73912). Homer A. Dunn. Abstract of paper before Am Elec Ry Assn. 2500 w. El R JI—Oct. 14, 1916. Critical discussion of practice.

Interpretation of Water Works Accounts (74125 N). 2000 w. A W W A

Consult Classification of the Index. See page 7.

Bonus Systems

Jl—Sept., 1916. Mark Wolff's paper is discussed.

Principles of Depreciation Accounting (74154 A). Robert G. Klotz. Ills. 6000 w. E M—Nov., 1916. Critical survey of three primary systems.

Discussion on "Inventories and Appraisals of Properties," at San Francisco, Cal., Sept. 16, 1915 (67687 D). 10000 w. A I E E, Pro—Feb., 1916. Articles by C. L. Cory, W. G. Vincent, Jr., and William J. Norton.

How to Appraise Water Rights (71267). Harry Barker. 4700 w. E N—June 22, 1916. Method.

How to Appraise Public Utility Property (71854). George W. Kuhn. 4000 w. El R Jl—July 15, 1916. Important points.

Modern Appraisal Service (72834 N). Walker A. Evans. 7 pp. N L M A—July, 1916. Scope and application.

Bonus Systems

See Management.

Chemistry

Chemistry and Banking (73811 B). John E. Gardin. 2500 w. Jl I & S E C—Oct., 1916. On capital invested in chemical industries.

City Finance

Financing Municipal Improvements (68499 A). Robert B. Tunstall. 2500 w. Jl Act—March, 1916.

Coal Land Valuation

Evaluating Coal Properties in Western Canada (67133). R. W. Coulthard. 3000 w. C M Jl—Jan. 1, 1916. Essentials which determine value.

Coal Mines

Nationalization of Coal Mines (73451 A). David Evans. 6000 w. I & C T R—Sept. 8, 1916. Financial and economic considerations involved.

Commerce

"Digging in" for the Coming Trade War (71342 A). Lewis R. Freeman. 4300 w. E M—July, 1916. Prospects of industries in the United States.

After the War (71194 B). Alba B. Johnson. 2500 w. E S W P, Pro—April, 1916. Reviews preparations necessary.

National Standard Specifications and Their Relation to Export Trade (71457 N). William R. Webster. 12 pp. A S T M—June, 1916. Difficulties; recommendations, &c.

Restriction of Output in Great Britain (71006 A). Charles Lancaster. 3000 w. I & C T R—May 26, 1916. Preparing for the coming commercial war.

Contract Estimating

Estimating Hints for the Contractor (67069). George W. Hill. 1700 w. El R & W E—Jan. 29, 1916. System of records for compiling data.

FINANCE AND COSTS**Cost Keeping****Contracting Accounting**

Contractors' Accounts (68498 A). T. Edward Ross. 1800 w. Jl Act—March, 1916. Requirements, methods, etc., for ordinary jobs.

Conversion Tables

Conversion Tables for the Valuation of Ores, Minerals and Metals (73757 A). 2000 w. M Mg—Sept., 1916. Tables for converting cents or pence per pound into £ sterling per ton and similarly calculating values.

See Accounting under MINING AND METALLURGY, *Base Metallurgy*.

Cost Accounting

Logical Factory Costs (67096 A). W. E. McHenry. 3500 w. E M—Feb., 1916. Urges adoption of more rational basis of distribution.

Cost Analysis

Methods of Figuring Costs (69987). C. B. Auel. 4800 w. El Jl—May, 1916. How to analyze costs. Illustrated by example.

Cost Department

The Relation of the Cost Department to the Factory Organization (68121 B). Clinton H. Scovell, with discussion. 5500 w. Ind Eng Soc—1915. Interesting remarks and suggestions.

Cost Keeping

Methods and Results of Cost Recording on Pavement Work at St. Paul, Minn. (66343). 3000 w. E & C—Dec. 8, 1915. Extract from a discussion by J. E. Carroll, before Minnesota Surveyors & Engrs' Soc.

Construction Cost Keeping by the Mason City, Iowa, Water Department (66344). W. A. Judd. 1200 w. E & C—Dec. 8, 1915. Details.

Cost-Keeping and Efficiency in Works of the Engineer Department (67744 N). Stuart C. Godfrey. Ills. 30 pp. Prof Mem—Jan.-Feb., 1916. Methods for construction work.

A Labor Cost-Keeping System for Concrete Bridge Work (67981). 800 w. E & C—Feb. 9, 1916. Forms and description.

Cost-Keeping and Efficiency in Works of the Engineer Department (68849 B). 17 pp. P M—Mar—April, 1916. Discussion of Godfrey's paper.

Keeping Systematic Costs in a Jobbing Shop (68493). John S. Watts. 1200 w. Fnd—March, 1916. Method for a small foundry that was found highly satisfactory.

Simplicity and Accuracy in Cost Work (69959 A). L. A. Miller. Ills. 1500 w. E M—May, 1916. System which proved satisfactory.

Consult Classification of the Index. See page 7.

Costs

FINANCE AND COSTS

Expense Distribution

Simplicity the Keynote of Oregon's State Highway Cost-Keeping System (71295). G. Ed. Ross. 3500 w. E R—June 24, 1916. Accurate results at minimum cost.

Is Your Cost System Scientific? (72049 A). William E. McHenry. 4000 w. E M—Aug., 1916. Faults in existing methods and suggestions for improving them.

Importance of True Cost (71739 A). Robert E. Belt. 2500 w. JI Act—July, 1916. Advantages to managers of properly kept costs.

Method of Keeping Costs on the Piute Irrigation Project Earth Dam (71910). Jos. Jensen. 1200 w. E & C—July 19, 1916. Outlines a simple system.

New Menace of Higher Manufacturing Costs (71778 A). John Nelson. 4000 w. I A—July 13, 1916. Burden of health and unemployment insurance for workmen.

A Simple and Efficient Cost Keeping System for Concrete Construction (72861). Condensed from thesis by Harry J. Gould. 2500 w. E & C—Aug. 30, 1916. Outlines methods used by a Cincinnati firm.

A Cost Keeping System for Building Contractors (73555). D. B. Duncan. 500 w. E C—Sept. 27, 1916. Forms and explanation of a much neglected field for cost keeping.

Aids to Estimating the Cost of Vitri-fied Pipe Sewers (74146). W. G. Kirchoffer. 1500 w. E N—Oct. 26, 1916. Empirical formula, tables and diagram based on experience and weighting of variable conditions.

Costs

New Method of Determining Factory Costs (72645 A). William Kent. 2000 w. I A—Aug. 24, 1916. Details of a "combination system" that has been found valuable.

Synthetic Costs (73574 A). J. K. Mason. 2000 w. E M—Oct., 1916. Must be so constructed that their details shall be traceable to cause.

The Checking of Estimates and Costs (73234 A). 1200 w. R G—Sept. 1, 1916. Serial, 1st part. Questions of timekeeping, wages, and cost of production. Valuable suggestions.

Foundry Costs (73189 N). C. H. Scovell. 3500 w. A F A—Sept., 1916. Suggestions for cost accounting.

L'Organisation Industrielle: L'Abaissement Du Prix De Revient (73525 D). Paul Lecler. 7300 w. S I E—July, 1916. Labor cost and selling prices in modern industry.

Cost Systems

The Operating Value of Cost Systems (74132 A). G. W. Mixter. 2200 w. I A—Oct. 26, 1916. From paper before Nat Imp & Veh Assn. Keeping detailed records. Suggestions. Importance of accurate accounting in any line of manufacture.

Depreciation

Depreciation of Property (66052 A). W. B. Curtiss. 7500 w. G E R—Dec., 1915. Serial, 1st part. First of series on accounting and finance.

Depreciation (67569 N). 36 pp. Util Mag—Jan., 1916. Depreciation Defined. Frederic P. Stearns. Court Decisions on Depreciation. J. H. Goetz. Depreciation and Its Relation to the Fair Value. Halford Erikson. With discussions by James E. Allison, John Bauer. Harry Barker, and others.

Depreciation and Valuation (67349 A). John J. Thomas. 3500 w. JI Act—Jan., 1916. Principles and problems always involved.

Determining the Mean Length of Life (68487 A). W. J. Spillman. 1600 w. T E—March, 1916. Data from article in *Science*.

As the Government Interprets Railroad Depreciation (71138). 1800 w. E R—June 17, 1916. Views of Engineering Board, Division of Valuation.

Some of the Absurdities of the Straight-Line Method of Determining Depreciation (71152 A). Jenks B. Jenkins. 1500 w. R G—June 2, 1916.

Depreciation as Applied to Valuation (72464). R. B. Shepard, Jr. 1700 w. E R—Aug. 12, 1916. Should not be deducted, according to prevailing ideas on the subject.

Some Factors to be Considered in Fixing Depreciation (65577). E. C. Hurd. Address before Nat. Ind. Tel. Assn. 3000 w. Telephony—Nov. 6, 1915. Ascertaining probable life of a telephone property.

Drawings

Methods and Cost of Reproducing and Reducing Engineering Drawings (72860). J. X. Cohen. 5000 w. E & C—Aug. 30, 1916. Processes, their possibilities and limitations.

Earnings

July Electric Earnings \$31,300,000 (73786). 1000 w. El W—Oct. 7, 1916. Increase over corresponding month of last year is 14.7 per cent in earnings, and 20.6 per cent in output.

Expense Distribution

Overhead Expense Distribution (66287 A). N. T. Ficker. 3500 w. E M—Jan., 1916. Eighth and last article of this excellent series.

Consult Classification of the Index. See page 7.

Exports

Way to remedy defects of machine-unit system by aid of "current variation" ratios which adjust manufacturing costs in periods of depression.

Overhead Distribution by the Machine Unit System (65991 A). N. T. Ficker. Ills. 4500 w. Engng Mag—Dec., 1915. Seventh article in series, taking up characteristics of unit system.

Exports

Is a Balance of Trade in Favor of Exports Favorable? (71517 A). Charles A. Gilchrist. 5000 w. S M—July, 1916. Problems of international trade.

Foundry Costs

Wertberechnung in der Giesserei (65483 B). J. and L. Treuheit. Ills. 4000 w. St u E—Oct. 28, 1915. Interesting formulas and tables for calculating financial results in foundry operation.

Gold

Canadian Gold and War Finance (70313 N). Adam Shortt, with discussion. 5000 w. C M I, Bul—May, 1916. Abnormal conditions caused by war.

Graphics.

Graphic Analyses of Managerial Problems (73785). Edwin D. Dreyfus. 1500 w. El W—Oct. 7, 1916. Use in solving problems of investment, revenue and expense.

Highway Accounting

System of Accounting and Cost Keeping in Use in the Oregon State Highway Department (69422). G. Ed. Ross. 3500 w. W E—April, 1916. Details.

Ice Business

Uniform Cost Finding (69309 A). Walter R. Sanders, with discussion. 4000 w. I & R—April, 1916. In the ice business.

Idle Plant

The Effect of Idle Plant on Costs and Profits (65481 N). H. L. Gantt. 4 pp. Am Acad Pol & Soc Sci Ann—Sept., 1915. Advantages of not closing down.

Insurance

Workingmen's Compensation Insurance (71674). 2000 w. El R JI—July 8, 1916. Abstract of report to N. Y. Elec. Ry. Assn. on different plans followed in N. Y. State.

Inventories

The Making and Maintenance of Priced Inventories of Public Utilities (67573 N). Charles L. Pillsbury. 11 pp. Util Mag—Jan., 1916. With discussions by James W. Phillips, F. W. Ballard, and R. J. Meigs.

Irrigation

Classification of Expenditures for Irrigation Work (68494). F. H. Newell. 5000 w. E & C—March 1, 1916. Five general heads.

FINANCE AND COSTS**Power Cost**

Accounting and Business Procedure as Applied to the Construction of Large Irrigation Projects (69071). Charles E. Bee. 4500 w. E & C—March 22, 1916. Forms and outline of plan tested and recommended.

Natural-Gas Valuation

See Valuation under MINING AND METALLURGY, *Oil and Gas*.

Mexico

Conditions in Mexico (71856). Ills. 3500 w. M & S P—July 15, 1916. Financial conditions, and some of the leaders and their activities.

Mine Accounting

Mine Accounting for Small Mines (68532 D). James E. Chapman. 3000 w. A I M E, Bul—March, 1916. Simple system.

Accounting and Engineering Show Results (71809). 2500 w. Cl A—July 15, 1916. Results obtained.

Mine Valuation

The Present-Value of a Mine (67975). F. Sommer Schmidt. 1800 w. M & S P—Feb. 5, 1916. Formulas.

Valuation of Anthracite Mines (67992 B). R. V. Norris. Read at Int. Engng. Cong. 3500 w. S M Q—July, 1915.

Mining

European Mining Finance (66162). J. L. Gallard. Read at Int. Engng. Cong. 5000 w. C M JI—Dec. 1, 1915. Importance; requirements; methods.

\$137,849,595 in Dividends by Mines and Works in Half Year (72321). George E. Sisley. Ills. 1500 w. M & E W—Aug. 5, 1916. Statistics of operation and production during six months ending in June, 1916.

Mining Stocks

Amortization and Depreciation (73455). Robert S. Lewis. 2500 w. M & S P—Sept. 23, 1916. Calculations and methods.

Municipal Accounting

Municipal Cost Data, Methods of Recording and Value (68496). Karl M. Mitchell. Read before City Mgrs. Assn. 2500 w. E & C—March 1 1916. Urges uniform system.

Paving Assessments

A Comparison of Paving Assessments in Various Cities in Iowa (73420 B). Charles A. Roby and C. W. Eby. 3000 w. Iowa Eng Soc—Feb., 1916.

Power Cost

Co-Relation of Factors Affecting the Cost of Power (68332 A). Reginald Trautschold. Ills. 4500 w. E M—March, 1916. Importance of the several factors that make up this item.

Consult Classification of the Index. See page 7.

Power Plants**Power Plants**

Record System for Office Building Plant (66924). 1000 w. Pwr—Jan. 4, 1916. Record and cost-accounting system.

Standardization of Power Plant Operating Costs (69295 A). Walter N. Polakov, with discussion. 6500 w. A S M E, JI—April, 1916. Outlines method.

Initial and Operating Costs of Power Plants (72746). Robert P. Kehoe. 1200 w. Pwr—Aug. 29, 1916. Table for comparison.

Prices

Report of Committee on Prices for Labor and Material (71876 N). 7 pp. M C B A—May 20, 1916. Analysis of prices.

Public Utilities

Reckoning with Costs of Superseded Equipment (72317). Edwin D. Dreyfus. 2500 w. El W—Aug. 5, 1916. Reasons why expenditures may remain in the capitalization.

Customer Ownership of Utility Securities (73779). William H. Hodge. 2500 w. El R & W E—Sept. 30, 1916. Results of plan adopted by a large syndicate.

Public-Utility Valuation

Some Intangible Values in Water Systems, with Special Reference to the Water Right (66742). Otto von Geldern. From a paper read in San Francisco. 4000 w. E & C—Dec. 22, 1915. Valuation of water-works.

Valuation of Los Angeles Distributing System (67502). 4000 w. El W—Jan. 22, 1916. Reviews the report of the So. Calif. Edison Co.

Uncertainty of Utility Valuation (67878). T. S. Williams. Abstract of address to the Am. Elec. Ry. Asso. 2200 w. El R JI—Feb. 5, 1916. Consequent hesitation of investors.

Valuation—A Common Sense View (68843 A). N. T. Guernsey. 28 pp. AE—Feb., 1916. Paper at Feb. 4 meeting. With discussion by George Weston and P. J. Kealy.

Methods Employed in Valuation (68488 A). C. M. Larson. Read at convention of Wis. Tel. Assn. 2500 w. T E—March, 1916. Details of methods advantageously followed in constructing an inventory and making a valuation.

Purchasing

Purchasing Supplies for the Panama Canal (65793 A). F. C. Boggs. From a paper at Int. Engng. Cong. 4000 w. Ir Age—Nov. 18, 1915. Methods used.

Buying Material on a Scientific Basis (71592 A). H. B. Twyford. 4500 w. I A—July 6, 1916. Position purchasing occupies in business. Points to be considered.

FINANCE AND COSTS**Selling**

Two Fundamentals in Purchasing (73347 A). H. B. Twyford. 1700 w. I A—Sept. 21, 1916. Buying the right materials from the right source.

Railway Accounting

Report of Committee XI—On Records and Accounts (68770 N). 1000 w. A R E A, Bul—Jan., 1916. Methods recommended.

Railways

See Operating Costs under RAILWAY ENGINEERING, *Traffic*.

Railway Valuation

Suggested Form of Inventory for Valuation of Common Carrier Property (65764 A). D. F. Jurgensen. 1200 w. Assn Engng Socs, Jour—Oct., 1915. Forms and notes.

Bay State Street Railway Valuation (66159). 3000 w. El R JI—Dec. 4, 1915. Methods and results of 18 months investigation in connection with fare case.

Chicago & Northwestern Ry. Valuation Methods (66547). Ills. 3000 w. E N—Dec. 16, 1915. Rules and instructions to engineers.

Principles of Railway Valuation (67877). Nathaniel T. Guernsey. Also discussions by George Weston and P. J. Kealy. 9000 w. El R JI—Feb. 5, 1916. Abstract of addresses to Am. Elec. Ry. Asso. General treatment.

Reproduction Cost Allocated Between Freight and Passenger Service (68985). 5000 w. E R—March 18, 1916. Uses ton-mile basis.

Review of 1915

Finance, Commerce, and Public Policy (66905). 8000 w. El W—Jan. 1, 1916. Survey of electrical industry for 1915, including contributions from well-known authors.

Securities

Selling Securities to Patrons (72446). Ills. 5000 w. El R JI—Aug. 12, 1916. Practices of the Byllesby properties, Chicago.

Selling

The Sales Engineer and His Relation to Production and Machine Design (72551). A. J. Baker. Ills. 3300 w. I T R—Aug. 17, 1916. Comments on changed conditions and influence of representatives.

The Six Principles of Scientific Salesmanship (72848 A). E. S. Elmo Lewis. 3000 w. E M—Sept., 1916. First of a series of articles. Discusses the problem of distribution.

Applying Scientific Methods to Sales (74161 A). E. St. Elmo Lewis. 3000 w. E M—Nov., 1916. Third article of a series discussing organization for sales.

Sewer Construction

Difficulties of Organizing Sales Combines (74181). J. F. Kellogg Brown. 2000 w. CI A—Oct. 28, 1916. Feasibility of organizing a central selling combine and results where this scheme has been tried.

Sewer Construction

Method of Keeping a Graphic Cost-Progress Record on Sewer Construction (67429). W. A. Bennett. 1000 w. E & C—Jan. 19, 1916. Chart and explanation of method.

Storekeeping

A Successful Stores Keeping System (69185 A). Charles Kist. 2000 w. E M—April, 1916. Employed by a large generating station.

Storeroom Systems (71293). A. Schwarz. 2500 w. El R JI—June 24, 1916. Purchasing and handling supplies.

Swiss Industries

Rapport de la commission de surveillance sur l'activite et l'etat financier des Institutions de Controle de l'A S E pendant l'annee 1915-16 (74240 B). 2500 w. S E V Bul—Sept., 1916. Review and statistics of Swiss electrical industries.

Trade

American Competition After the War (72300 A). 1500 w. Enr—July 21, 1916. Review of the governing conditions of competition between Britain and America.

Trade Acceptances Growing in Favor Among Iron and Steel Manufacturers and Dealers of United States (72262). Guy F. Creveling. 4500 w. I T R—Aug. 3, 1916. Advantages.

Trade Associations

Trade Associations and Better Business Methods (71626 A). Edward N. Hurley. Address before Boston Commercial Club. 3500 w. Mch E—June 23, 1916. Government co-operation, standard accounting, trade associations, etc.

The German Steel Syndicate and Cartels (72017 A). 10500 w. I & C T R—July 7, 1916. Greater portion of a reprint of a study by Francis Walker.

Trade Financing

Financial Facilities for Trade (73842 A). 2200 w. Eng—Sept. 29, 1916. Editorial on report of the Government Committee, and their decision in favor of a trade credit bank.

Trade Possibilities in Central America (74163 A). Edward Perry. 3500 w. E M—Nov., 1916. Suggests possibilities for added trade.

Unit Costs

Unit Costs in Construction (68497). Sanford E. Thompson. 1800 w. E & C—March 1, 1916. Need of more accurate estimates.

FINANCE AND COSTS**Unit Prices**

Unit Prices (67571 N). M. G. Glaeser. 4500 w. Util Mag—Jan., 1916. Their importance; what they include; how they shall be determined.

Utility Bonds

Utility Bonds for Savings Banks (74188). 4000 w. El R JI—Oct. 28, 1916. Suggested standards.

Valuation

Conference on Valuation (65727). 7000 w. Elec Ry Jour—Nov. 13, 1915. Serial, 1st part. Delegates in Philadelphia discuss questions in valuation work.

Reproduction Basis of Valuation Criticised (65871). John M. Eshleman. 2500 w. Eng Rec—Nov. 20, 1915. Part of Philadelphia address. Warns against government competition.

Financial Aspects of Valuation (67572 N). Paul A. Sinsheimer. Also Financial Aspects of Regulation. Robert C. Wood. 6000 w. Util Mag—Jan., 1916. Inflated costs; need for control of credit; need of regulating prices, etc.

Valuation by Approximation (67574 N). John G. Morse. 9 pp. Util Mag—Jan., 1916. With discussions by Alexander Potter, Morris Llewellyn Cooke, Walter N. Polakov, and others.

Valuation and the Future of Public Utilities (67577 N). Milo R. Maltbie. 4000 w. Util Mag—Jan., 1916.

The Meaning of the Constitutional Protection in Valuation (67576 N). Charles A. Prouty. Also article by William D. Kerr. 13 pp. Util Mag—Jan., 1916. With discussions by Newton D. Baker and A. L. Valentine.

Franchise Values (67567 N). 19 pp. Principles as to Franchise Values. Dr. Delos F. Wilcox. Determining Franchise Values. Henry DeForest Baldwin. With discussions by Chester A. McLain, Alfred Bettman and Harry Barker.

Going Value (67570 N). 24 pp. Util Mag—Jan., 1916. Introductory Remarks. Morris Schaff. Going Value as an Element of Fair Value. Clifford Thorne. With discussions by Joseph L. Bristow, A. M. Fox, William J. Hagenah, and others.

Land Values (67568 N). 23 pp. Util Mag—Jan., 1916. Principles to be Applied in Valuing Land. Hammond V. Hayes. Discussions by Thomas D. O'Brien, Edward W. Doty, A. E. Helm, John M. Eshleman, F. W. Stevens, Dr. Milo R. Maltbie, and others.

Original Cost (67566 N). 31 pp. Util Mag—Jan., 1916. How to Get Rid of the Reproduction Cost Theory. George W. Anderson. Original Cost as the Chief Basis for Fair Value. Dr. Edward W.

Valuation

FINANCE AND COSTS

Wages

Bemis. Original Cost. Halford Erickson. Constitutionality of Historical Cost Method of Public Utility Valuation. Alfred Bettman. With discussions by Dr. Robert H. Whitten, Edward P. Burch, and others.

The Reproduction Theory (67565 N). 22 pp. Util Mag—Jan., 1916. Criticism of Reproduction Theory of Valuation. John M. Eshleman. Reproduction Value vs. Fair Value. H. Findlay French. With discussions by Morris Knowles, Halbert P. Gillette, A. B. du Pont, James E. Allison and John M. Eshleman.

Economic Phases of Valuation Engineering (68117 B). Alex R. Holliday. With discussion. 2500 w. Ind Eng Soc—1915. Tangible and intangible values.

Important Principles Involved in Valuation (68941). Pierce Butler. 6000 w. R A G—March 17, 1916. Fundamental problems and possible results.

Relieving the Investors' Uncertainty (68738). John Bauer. 4500 w. El R JI—March 11, 1916. Discusses automatic control.

How Buildings Were Appraised in Revaluation of Real Property of Los Angeles (69384). J. C. Bannister. 4000 w. E R—April 8, 1916. Unusual methods.

Valuation of Water Rights for Power Companies (69375). J. P. Newell. 2100 w. E N—April 6, 1916. Theories.

Illinois Decision on Valuation in Springfield Gas and Electric Case (70680). 4800 w. El R JI—May 27, 1916. Original cost a very important factor.

Prospective Development and Earnings Affect the Value of a Railroad (70673). R. B. Shepard, Jr. 2500 w. E R—May 27, 1916. Trend of expenses and revenues must be developed from past and projected into future.

Valuation of Railroad Right-of-Way (70888 N). A. M. Sakolski. 20 pp. A E R—June, 1916. Review of legal and economic phases.

How to Reduce the High Cost of Valuation (71533). Frederic Nicholas. 1000 w. El W—July 1, 1916. An interview with Dr. Milo R. Maltbie.

Importance of Costs in Valuations and Rate Making (71826). Halford Erickson. 5500 w. Tly—July 15, 1916. Read before Wis. State Tel. Assn. Methods by which cost service is determined.

What the Government Valuation Division is Doing and How the Work is Handled (71671). C. W. Stark. 3500 w. E R—July 8, 1916. Serial, 1st part. New problems met.

The First Tentative Valuation Reports (72276). 2500 w. R A G—Aug.

4, 1916. Contentions of the government and attitude of the carriers.

Federal Valuation of Railroads (72633 N). H. L. Ripley, with discussion. 5500 w. Conn Soc Civ Engrs—1916. Outlines the work.

Much Work for Railroad-Valuation Engineer Precedes Advent of Government Forces (72716). C. W. Stark. 1500 w. E R—Aug. 26, 1916. System evolved by Jenks B. Jenkins for showing valuation sections.

Railroad Operating Expenses and Property Values (72216 A). A. M. Sakolski. 3500 w. JI Act—Aug., 1916. Methods of apportionment.

Railroads' Side of Valuation, as Handled on Jersey Central, No Small Task (72408). C. W. Stark. 1500 w. E R—Aug. 5, 1916. Describes work.

Bases of Valuation in the Control of Return on Public Utility Investments (73322 N). John Bauer. 7000 w. A E R—Sept., 1916. Urges the adoption of a clear single standard of valuation.

The Employees and Federal Valuation (73057). 1500 w. R A G—Sept. 8, 1916. Abstracted from B. & O. Employees' Mag. How employees can assist in accurate valuation.

The Valuation of Mines (73120 N). R. A. Lehfelt. 900 w. C M M S S A, JI—July, 1916. Deals with the question mathematically.

Commission Valuation for Rate Purposes (73914). John E. Benton. Abstract of paper before Am. Elec. Ry. Assn. 5500 w. El R JI—Oct. 14, 1916. Origin of fair value rule.

How Should Abandoned Property Be Valued? (74056). R. B. Shepard Jr. 2000 w. E R—Oct. 21, 1916. Of three classes, that eliminated because of inadequacy during the development should be included in reproduction cost.

Overhead Charges in Valuation Work (73909). Philip K. Kealy. Abstract of paper before Am Elec Ry Assn. 5800 w. El R JI—Oct. 14, 1916. Considers charges associated with cost of reproducing.

Valuation of Rock Island Terminal Zone in Chicago Presents Many Special Problems (73623). C. W. Stark. 3300 w. E R—Sept. 30, 1916. First inventory of a terminal in Federal valuation.

Wages

Modern Wages in Manufacture (74080 A). F. Bayle. Abstract of paper before Soc Internat Elect'ns. 2500 w. Elec—Oct. 6, 1916. Considers Taylor's system and need of preparing for conditions at the close of the war.

Consult Classification of the Index. See page 7.

Water Power**MANAGEMENT****Co-operation****Water Power**

Water Power in the Empire (72777). 2000 w. T E S—July 28, 1916. Comparison of methods of forming and financing power companies in Great Britain and other countries.

The Rules and Regulations of the Province of British Columbia Relating to the Annual Rental Fees of Water Powers (72363 N). E. Davis. Charts. 19 pp. C S C E—Feb. 17, 1916. Outlines methods that should be adopted in

securing necessary information for appraisal.

See also Depreciation, under *Finance and Costs*.

Water-Works

Unusual Water-Works Purchase (69094). Burt A. Heinly. 2700 w. E N—March 23, 1916. At Los Angeles.

Interpretation of Water Works Accounts (70585 N). Mark Wolff. 5000 w. A W W A, JI—June, 1916. Requirements and methods.

MANAGEMENT**Administration**

Visualizing the Essential Facts of a Business (72046 A). 3300 w. E M—Aug. 1916. Using graphs for showing operation data.

The Machine Shop: Its Work and Administration (71736 A). 1200 w. Mch W—June 30, 1916. Serial, 1st part. Co-operation necessary.

How Graphic Control Facilitates the Fixing of Profits (73549 A). Dwight T. Farnham. Ills. 2500 w. E M—Oct., 1916. Final paper of a series. Explains how graphs may aid in standardizing profits.

Scientific versus Intuitive Administration (72850 A). Dwight T. Farnham. 2500 w. E M—Sept., 1916. Third paper of a series. Use of graphs or charts.

Bonuses

Paying Bonuses to Indirect-Labor (67972 A). 4500 w. I A—Feb. 10, 1916. Methods.

Bonus Systems

"Speeding Up" in an Engineering Factory (70048 A). R. Rankin. Abstract of paper before Jun. Inst. of Engrs. 2200 w. Eln—April 21, 1916. Serial, 1st part. Logical basis of bonus systems.

Théories Mathématiques Des Salaires (73521 B). A. Breton. Chart. 1300 w. La Nt—Aug. 26, 1916. Review of well known premium and bonus systems of wage payment.

Système d'Établissement de Salaires Avec Primes (74235 C + D). L. Revillon. 2300 w. R Met—March-April, 1916. Discussion of Taylor, and other systems.

Central Stations

Management of Electric Central Stations (65988 A). Walter N. Polokov. 3500 w. Engng Mag—Dec., 1915. Second and concluding article of series; methods of introducing scientific management into power-generating plants.

The Efficiency of Labor (70043 A). E. E. Hoadley. 1200 w. El R—April 21, 1916. For central stations.

Chemical Industries

Les Grandes Industries Chimiques Organiques Après La Guerre (72792 B). A. Mailhe. 11,000 w. R G S—July 30, 1916. Development of French chemical industries after the war.

Collective Bargaining

Collective Bargaining in the Anthracite Coal Industry (69222 N). 165 pp. U S D L—Bul 191. Trade agreements.

Consent

The Progressive Relation between Efficiency and Consent (66266 N). Robert G. Valentine. 3500 w. S P S M Bul—Nov., 1915. Dangers in application of Taylor system.

Construction

Scientific Methods in Construction (72139 B). Sanford E. Thompson and William O. Lichtner. 32 pp. E S W P, Pro—June, 1916. Application of modern methods of management to engineering construction.

Contracting

Office Methods for a Small Contracting Business (69344). C. M. Cobb. 4000 w. E & C—April 5, 1916. Enabling one man to handle work.

Co-operation

Pulling Together for More Business (70218). 2000 w. El W—May 6, 1916. Co-operation in Cincinnati harmonized electrical interests.

For Closer Co-operation Between the Manufacturers and Contractors of Heating Apparatus (72629). Frederick W. Herendren. 3000 w. H & V M—Aug., 1916. Paper read before Nat. Assn. of Master Steam and Hot Water Fitters.

Co-operation: A Report (73411 B). W. G. Raymond. 3000 w. Iowa Eng Soc—Feb., 1916. Schemes for co-operation.

Engineering Co-operation (73410 B). F. H. Newell. 1800 w. Iowa Eng. Soc.—Feb., 1916. Urging organization.

Results of Closer Co-operation Between the Engineer and the Foundry (72896 N).

Consult Classification of the Index. See page 7.

Efficiency

23 pp. A F A—Sept., 1916. A symposium covering gray iron, steel, malleable and non-ferrous metal foundries.

Steinmetz on Co-operation (72962). 2000 w. El W—Sept. 2, 1916. Review of his address before the International Assn. of Municipal Electricians.

Industrial Associations (74202 B). 1350 w. Nt—Sept. 28, 1916. Suggestions for co-operation between manufacturers and universities in England.

Handling Stores According to the Cash-Control Idea (66131). Wilfred G. Astle. Ills. 2500 w. El R & W E—Dec. 4, 1915.

Efficiency

Efficiency (68067 D). George W. Rear. 6500 w. Am Ry Brdg & Bldg Asso—Oct., 1915. Factors controlling efficiency.

Efficiency in Production (70177 A). Ills. 1500 w. T E S—April 28, 1916. Principles and practice.

How to Study Factory Efficiency (70609 A). J. K. Mason. 3000 w. E M—June, 1916. First of a series of essays on introducing efficiency methods.

How to Study Factory Efficiency (71347 A). J. K. Mason. Charts. 2800 w. E M—July, 1916. Explains method of locating shop losses.

About Scientific Management (71240 A). W. H. McAloney. 2000 w. Ae—June, 1916. Possibility of increasing efficiency.

Democracy as a Factor in Industrial Efficiency (70918 D). Horace B. Drury. 5000 w. Annals Am Acad—May, 1916. Principles that make for the efficiency of democracy.

How to Increase Production with the Present Force (71350 A). R. W. Higgins. 4500 w. E M—July, 1916. Successful method.

The Relation of Home Conditions to Industrial Efficiency (70946 D). Mary Barnett Gilson. 4500 w. Annals Am Acad—May, 1916.

How to Increase Factory Efficiency (72047 A). O. M. Becker. Ills. 4000 w. E M—Aug., 1916. The importance of cleanliness and comfort.

Employing Methods That Make Good Workers (72227 A). Robert T. Kent. 2500 w. I A—Aug. 3, 1916. Lowest labor turnover in the industry.

How to Increase Factory Efficiency (72846 A). O. M. Becker. Ills. 2500 w. E M—Sept., 1916. Final paper of a series. Deals with beneficial results of physical welfare.

Principles of Military and Naval Efficiency in Civil Life (72246 A). Austin M. Knight. 5000 w. W P I, JI—July, 1916. Individual preparedness.

MANAGEMENT

Employment

The Problem of Efficiency (72449). James R. Finlay. 3000 w. M & S P—Aug. 12, 1916. Address before Colo. Sch. of Mines, Golden.

Men and Output (74223). 3300 w. T E S—Sept. 29, 1916. British and American shop methods compared.

See also Factory Ventilation, under *Management*.

Efficiency Methods

Pushing Up Production and Lowering Cost (72045 A). C. U. Carpenter. 4500 w. E M—Aug., 1916. Serial, 1st part. Example of results from application of efficiency methods.

Eight-Hour Day

The Eight-Hour Day (65987 A). C. J. Morrison. 2500 w. Engng Mag—Dec., 1915. Specific examples of cases where shorter hours have lowered costs.

Equipment

The Economical Features of Industrial Equipment (70172). H. Eisert. Ills. 4 pp. Eng Club Balt, JI—May, 1916. Mathematical analysis.

Employment

The Aim and Work of Employment Managers' Associations (70922 D). Meyer Bloomfield. 4000 w. Annals Am Acad—May, 1916. Outlines the society's work.

The Employment Manager (70916 D). Ernest Fox Nichols. 2200 w. Annals Am Acad—May, 1916. The human problems. Training managers.

The Employment Problem in Industry (70917 D). William C. Redfield. 1800 w. Annals Am Acad—May, 1916. Economy of good wages and good treatment.

The Employment Work of the Curtis Publishing Company (70925 D). Robert C. Clothier. 6000 w. Annals Am Acad—May, 1916. Details of the employment, medical, instruction and welfare divisions.

Employment Problems and How the John B. Stetson Company Meets Them (70930 D). Milton D. Gehris. 1800 w. Annals Am Acad—May, 1916. Outlines methods.

A Functionalized Employment Department as a Factor in Industrial Efficiency (70921 D). Ernest Martin Hopkins. 3000 w. Annals Am Acad—May, 1916. Its aims and work.

Hiring and Firing: Its Economic Waste and How to Avoid It (70928 D). Magnus W. Alexander. 6000 w. Annals Am Acad—May, 1916. Analysis of statistics showing money waste and its prevention.

The Instruction of New Employees in Methods of Service (70941 D). Arthur Williams. 3000 w. Annals Am Acad—May, 1916. Work of corporation schools.

Consult Classification of the Index. See page 7.

Executives' Club

MANAGEMENT

German Railways

Introducing the New Employee (70940 D). Charles L. Pearson. 700 w. *Annals Am Acad*—May, 1916. Methods of German-American Button Co., Rochester, N. Y.

Methods of Reducing the Labor Turn-over (70929 D). Boyd Fisher. 4000 w. *Annals Am Acad*—May, 1916. Methods of accomplishing this result.

The Need for and Value of Physical Examination of Employees as Illustrated in the Work of the Rike-Kumler Company (70939 D). Frederick H. Rike. 2000 w. *Annals Am Acad*—May, 1916.

Problems Arising and Methods Used in Interviewing and Selecting Employees (70937 D). Katharine Huey. 3300 w. *Annals Am Acad*—May, 1916. Requisites of an employment office and methods used.

Public Employment Bureaus and Their Relation to Managers of Employment in Industry (70932 D). Hilda Muhlhauser. 2000 w. *Annals Am Acad*—May, 1916. The Cleveland, O., plan.

Records and Reports of Work (70944 D). J. W. Bancker. 2000 w. *Annals Am Acad*—May, 1916. Details of employment routine.

Selection of Employees by Means of Quantitative Determinations (70934 D). Walter Dill Scott. 2500 w. *Annals Am Acad*—May, 1916. Methods of testing.

University Schools of Business and the Training of Employment Executives (70927 D). Harlow S. Person. 4000 w. *Annals Am Acad*—June, 1916. Functions, qualifications and necessary training.

The Value of the Application Form (70938 D). Charles P. Avery. 1000 w. *Annals Am Acad*—May, 1916. Value to applicant and employer.

The Work of the Employment Department of Dennison Manufacturing Company, Framingham, Mass. (70924 D). Philip J. Reilly. 2500 w. *Annals Am Acad*—May, 1916. Outline.

The Work Program of the Employment Managers' Association of Boston (70926 D). Ralph G. Wells. 1700 w. *Annals Am Acad*—May, 1916. Objects of the association.

Written Specifications for Hiring (70933 D). R. J. Burke. 1800 w. *Annals Am Acad*—May, 1916. The function and purpose, with suggestions.

See also Labor, under *Management*, and Industrial Training, and Vocational Tests, under *Education*.

Executives' Club

The Detroit Executives' Club (70607 A). Boyd Fisher. 3000 w. *E M*—June, 1916. Co-operative club for study of management.

Factory Buildings

Building the Factory (70605 A). John J. Klaber. Ills. 3000 w. *E M*—June, 1916. Characteristic types, urging careful study of needs.

Factory Construction

How to Increase Factory Efficiency (68330 A). O. M. Becker. Ills. 4000 w. *E M*—March, 1916. Advantages of good natural lighting; how to secure it.

Factory Districts

See City Planning under *CIVIL ENGINEERING, Municipal*.

Factory Engineering

General Factory Mechanical and Electrical Engineering (68123 B). S. J. H. White. 4000 w. *Ind Eng Soc*—1915. Preventable losses.

Factory Heating

How to Increase Factory Efficiency (70603 A). O. M. Becker. Ills. 3500 w. *E M*—June, 1916. Third of series of articles; how to heat the factory.

Factory Illumination

How to Increase Factory Efficiency (69180 A). O. M. Becker. Ills. 5000 w. *E M*—April, 1916. Second article of a series dealing with adequate illumination.

How to Increase Factory Efficiency (69954 A). O. M. Becker. Ills. 6000 w. *E M*—May, 1916. Lamps available, their arrangement, etc.

Factory Losses

Factory Wastes and Remedies (72166 A). F. E. Merriam. 1200 w. *Mch W*—July 21, 1916. Common wastes and losses and effective remedies.

Factory Ventilation

How to Increase Factory Efficiency (71343 A). O. M. Becker. Ills. 5500 w. *E M*—July, 1916. Fourth of a series: how to ventilate the factory.

Ford Shops

The New Ford Line-Up (66288 A). Fay L. Faurete. Ills. 2500 w. *E M*—Jan., 1916. Changes in personnel of the Ford Motor Co.

Foundry Operations

Analyzing Foundry Operations as a Basis for Improvement in Shop Conditions (72893 N). R. E. Kennedy. 18 pp. *A F A*—Sept., 1916. Possible improvements shown by time studies.

The Human Factor in Foundry Production (73348 A). Ills. 2500 w. *I A*—Sept. 2, 1916. From address by Luther D. Burlingame describing methods of the Brown & Sharpe Mfg. Co.

German Railways

Where German Efficiency Falls Down (71101). H. W. Faus. 3000 w. *R A G*—June 16, 1916. Facts from official statistics of railways in Germany.

Industrial Management

MANAGEMENT

Planning System

Industrial Management

Growth of the Science of Industrial Management (74158 A). John R. Dunlap. 4000 w. E M—Nov., 1916. Review of the lines along which this study can best be followed.

Testing the Fitness of Your Employees (74153 A). William Fretz Kemble. Ills. 5500 w. E M—Nov., 1916. Practical test to determine physical and mental abilities.

Industrial Power

Motor Drive Effects. Economies in Shoe Factory (74191). Ills. 1000 w. El R & W E—Oct. 28, 1916. Installation in Seattle.

Industrial Village

Eenige mededeelingen omtrent den bouw der fabriek van "Werksspoor" te Zullen en het tuindorp "Elinkwijk" (74207 B). G. J. Langhout. 4600 w. Ing—Sept. 16, 1916. Description of large extensions and improvements in a Dutch factory village.

Labor

Americanization: A Conservation Policy for Industry (70942 D). Frances A. Kellor. 1500 w. Annals Am Acad—May, 1916. How to stabilize the labor supply.

Democracy and Industry (70920 D). Ernest Martin Hopkins. 4000 w. Annals Am Acad—May, 1916. Real democracy in industrial systems, and how to achieve it.

The Establishment of Permanent Contracts with the Sources of Labor Supply (70931 D). John S. Keir. 3500 w. Annals Am Acad—May, 1916. Discusses methods tried and practices of large firms.

A Catechism of the Adamson Pay Day Law (73546). 2500 w. R A G—Sept. 29, 1916. Questions and answers making clear its aim.

See also Employment, under *Management*.

Labor Supply

Labor and Industry After the War (69179 A). Frederic C. Howe. 1800 w. E M—April, 1916. Reduction of immigration and how to prepare for shortage.

Motion Study

Chronocyclegraph Motion Devices for Measuring Achievement (67564 N). Frank B. Gilbreth, and L. M. Gilbreth. 4500 w. 2nd Pan Am Cong—Jan 3, 1916. Utilization of the human element; standardization of motions; device for measuring achievement.

The Effect of Motion Study Upon the Workers (70945 D). Frank B. Gilbreth and Lillian M. Gilbreth. 1500 w. Annals Am Acad—May, 1916. Methods and apparatus used, with results.

Motor Trucks

Economies by the Use of Motor Trucks in Industrial Establishments (73573 A). William P. Kennedy. Ills. 5000 w. E M—Oct., 1916. Cost reduced by proper equipment.

Navy Yards

Industrial Management in Navy Yards (69457 B). I. I. Yates. 2000 w. U S N I, Pro—March-April, 1916. Methods applicable to all yards.

Organization

Executives and Modern Organization (71341 A). Dwight T. Farnham. 5000 w. E M—July, 1916. Details of scientific administration in present number.

Organizaciones que conducen a la eficiencia (71315 A). Pedro R. Irizar. 4500 w. S C I Rv—June, 1916. Organizations conducive to efficiency.

Building for Future Shop Organizations (71905). W. M. Alexander. 3000 w. S & I—July, 1916. Outlines plan.

Report of Committee on Co-operation with Other Railway Mechanical Organizations (71887 N). 25 pp. A R M M A—April 15, 1916. Four papers submitted by different organizations.

Le Direttive Dell' Organizzazione Industriale Moderna (72787 B). 1900 w. Ind—July 16, 1916. Abstract of Leclerc's paper before French Civil Engineers on modern industrial organization.

Los Principos Que Conducen A La Eficiencia Organizada (72797 A). P. R. De Irezar. 11,000 w. S C I Rv—Aug., 1916. Comprehensive review of the practical applications of the principles of efficiency as applied to organization.

Personal Relationship

Personal Relationship as a Basis of Scientific Management (66265 N). Richard A. Feiss. 20000 w. S P S M Bul—Nov., 1915. Remarkable success of Joseph & Feiss Co.

Personnel

Personal Relationship as a Basis of Scientific Management (70919 D). Richard A. Feiss. 9000 w. Annals Am Acad—May, 1916. Correct methods of handling men.

Piecework

Instituting a Piecework System (70748 A). J. D. Smith. 1000 w. Mch W—May 19, 1916. Serial 1st part. Details of a comprehensive but simple system.

Planning System

Dispatch System of Norton Grinding Company (71589 A). Ills. 2500 w. I A—July 6, 1916. Details of a system for dispatching work.

Consult Classification of the Index. See page 7.

Power Plants

MANAGEMENT

Scientific Management

Power-Plants

Data and Discussion on Efficiency in Public Utility Power Plants (68146). Charles Brossmann. Read before Indiana joint convention. Ills. 2500 w. E & C—Feb. 16, 1916. Factors affecting economy.

Efficient Power Plant Operation and Management (67832). George F. Weaton. 3000 w. N E—Feb., 1916. Work system. Time study.

Production

Increasing Production at Decreased Cost (73578 A). C. U. Carpenter. 4000 w. E M—Oct., 1916. Successful methods of training employees.

Production and Sales (66291 A). Henry L. Gantt. 3500 w. E M—Jan., 1916. Refutation of theory that high selling prices are necessary to large profits.

Regulating and Balancing Production (71477 A). H. A. Russell. 1500 w. I A—June 29, 1916. Serial, 1st part. First of three articles describing methods.

The Importance of Increased Production (72531 A). W. L. Hichens. 2500 w. Mch E—July 28, 1916. Effect of war.

Trade War and Productive Power (72577 A). H. F. L. Orcutt. 5500 w. Eng—Aug. 4 1916. The position of the English manufacturer in the industrial world.

How a Worcester Plant Controls Production (73725 A). W. E. Freeland Ills. 2000 w. I A—Oct. 5, 1916. Details of a new machine shop.

Production System in a 75-Man Shop (74015 A). W. E. Freeland. Ills. 2500 w. I A—Oct. 19, 1916. New plant at Waterbury, Conn. Routing methods.

Profit Sharing

The So-Called Profit Sharing System in the Ford Plant (70948 D). John R. Lee. 5000 w. Annals Am Acad—May, 1916. Explanation.

Profit-Sharing as a Factor in Preparedness (73183 N). C. E. Knoepfel. 3000 w. A F A—Sept., 1916. Presents a plan which bases the reward on individual attainment.

Promotion

The Three Position Plan of Promotion (65382 A). F. B. and L. M. Gilbreth. 3000 w. Ir Age—Nov. 4, 1915. Scheme of advancement.

The Three Position Plan of Promotion (70947 D). Frank B. Gilbreth and Lillian M. Gilbreth. 2500 w. Annals Am Acad—May, 1916.

Publicity

Under-Advertising of the Steel Industry (65986 A). Geo. H. Jones. 3500 w. Engng Mag—Dec., 1915. Why steel

makers should advertise, what they should advertise and how.

Purchasing

Anticipating Buying Emergencies (66097 A). H. A. Russell. 2500 w. I A—Dec. 2, 1915. Information needed to guard against shortage of material.

Trained Buyers Save Big Sums in City Purchases of Supplies and Equipment (66153). Extracts from address by Fowler S. Smith at City Mgrs' convention. 1800 w. E R—Dec. 4, 1915. Economies possible under city manager.

Railroad Shops

Essentials of Shop Efficiency (69401 A). G. W. Armstrong. 2200 w. R M E—April, 1916. Features of scientific management applicable to railroad shops.

Railway Storekeeping

See Storekeepers under RAILWAY ENGINEERING, *Miscellany*.

Sales Department

Sales versus Operating Department (68337 A). Dwight T. Farnham. 3500 w. E M—March, 1916. Method for avoiding friction.

Scientific Management

The Principles of Scientific Management (65607 A). Frederick Winslow Taylor. Abstract of an address delivered March 3, 1915. 3500 w. Ind Engng—Sept., 1915. Serial, 1st part. As regarded in its latest development, by its founder.

Scientific Management Under the X-Ray (65941 A). 3500 w. Ir Age—Nov. 25, 1915. Regarded as prejudicial to organized labor.

How to Create Industrial Leaders (65993 A). H. L. Gantt. 4000 w. Engng Mag—Dec., 1915. Basic principles of democracy on which our industrial development must be founded. First of two articles.

Scientific Management in Government Establishments (65488 B). Gen. William Crozier. 8000 w. Soc Pro Sci Man Bull—Oct., 1915. Address before Phil. School of Comm. & Accts. Status of attempts to introduce methods into arsenals.

Exact Control of Manufacture in Practice (66544 A). George D. Babcock. Address before the Univ. Ind. Soc. 4000 w. I A—Dec. 16, 1915. Results of four years experience.

The Engineer as an Economist (69177 A). Henry R. Towne. 2200 w. E M—April, 1916. Historic paper read before the A. S. M. E. thirty years ago with personal letter from author.

Scientific Management in Industry and What it Includes (73324 A). George M. Price. 2500 w. A J I P H—Aug., 1916. Should include standardization, sanitation and hygiene, insurance, etc., etc.

Selling**Selling**

The Six Principles of Scientific Salesmanship (73548 A). E. St. Elmo Lewis. 3500 w. E M—Oct., 1916. Second article of a series investigates the market.

Shop Practice

Scheduling Work for Light Manufacturing (73958). Charles C. Lynde. Ills. 1500 w. S & I—Oct. 1916. Arrangement of units and schedules to give best production.

Shop System

The Detail Engineer (72171 A). George P. Pearce. Ills. 3500 w. Mch—Aug., 1916. Simplified design and a shop system.

Special Industries

Les Efforts De L'Industrie Francaise Pendant La Guerre (72805 C + D). 5500 w. S E I N—May-June, 1916. How special industries such as glassware, platinum, radiographic screens, etc., have been carried on during the war.

Steam Generation

Economy In Steam Generation (73534). 1500 w. T E S—Aug. 25, 1916. Methods of securing better results, including bonuses.

Stock Department

Checking Losses in the Storeroom (67579). Wilfred G. Astle. 3000 w. I T R—Jan. 27 1916. "Balance of stores" system; advantages.

Stock Keeping

Stock Keeping in Adding Machine Factory (66337 A). F. L. Prentiss. Ills. 2200 w. I A—Dec. 9, 1915. Handling and routing.

Store-Keeping

Efficiency in the Stores Department (65365). Wilfred G. Astle. Ills. 3500 w. Elec Ry Jour—Oct. 30, 1915. Location; systems; accounting, etc.

Steel Storage in a Hartford Factory (71590 A). Ills. 1800 w. I A—July 6, 1916. Unloading and storage methods.

Storehouse Methods That Reduce Labor (71855). W. V. C. Bulkeley. Ills. 2500 w. El R JI—July 15, 1916. System which greatly increased efficiency.

Street-Railway Shops

Planning and Efficiency System in Portland (Ore.) Shops (68995). F. P. Maize. Ills. 7500 w. El R JI—March 18, 1916. Taylor system.

See Supply Manufacture under STREET AND ELECTRIC RAILWAYS.

Strikes

Another Strike Hits New York (73067). 4000 w. El R JI—Sept. 9, 1916. Individual working agreements the main cause of trouble.

Prevention of Railroad Strikes (73543). 1300 w. R A G—Sept. 29, 1916. Plan

MANAGEMENT**Wage Systems**

proposed by Henry R. Towne, based upon the principle of a constructual relationship.

Railway Strike Ordered for September 4 (72922). 15000 w. R A G—Sept. 1, 1916. Progress of negotiations, President Wilson's address to Congress, views of railway executives, etc., with two editorials.

Taylor System

The Taylor System of Management in the Franklin Shops (72849 A). George D. Babcock. 3000 w. E M—Sept., 1916. Serial, 1st part. Results of adoption.

The Taylor System of Management in the Franklin Shops (73547 A). George D. Babcock. 5000 w. E M—Oct., 1916. Details of the system as installed.

How the Taylor System Was Applied in the Franklin Shops (74155 A). George D. Babcock. Ills. 3000 w. E M—Nov., 1916. Classification and standardization methods. Third article.

Telephone Plant

Duties of Plant Superintendent of a Telephone Company (68578). L. E. Hurtz. 1500 w. Tly—March 4, 1916. Organization at Lincoln, Neb.

Three-Shift Plan

The Twenty-four Hour Day (68335A). C. J. Morrison. 2000 w. E M—March, 1916. Success of three-shift operation.

Time Keeping

Keeping Workmen's Time (73283 A). Daniel J. Hauer. 2500 w. Cnr—Sept. 15, 1916. Serial, 1st part. Practical methods.

Time Study

The Use of Time Study for Rate Setting (65608 A). Robert Thurston Kent. 5000 w. Ind Engng—Sept., 1915. Complete machine analysis by time study.

Wage Controversy

Trainmen's Wage Controversy (72944). 4800 w. R R—Sept. 2, 1916. Record of the trainmen's strike and the proposed eight-hour act.

Wage Systems

The Work, the Worker, and His Wages (68650 A). F. B. and L. M. Gilbreth. 2500 w. I A—March 9, 1916. Answers to objections to scientific management.

Application d'une theorie du salaire moderne. Le tarif de guerre B. F. F. (68864 B). F. Bayle. 3500 w. Gn Cv—Mar. 11, 1916. New mathematically developed formula for wage payment.

Fixing Individual Wage Rates on Facts (70902 A). George D. Babcock. 3500 w. I A—June 8, 1916. Explains rating system.

The Public Carrier and the Wage Scale (71031). Charles Nagel. 5000 w. S L R C. Pro—May 12, 1916. Some difficulties in arbitration.

Consult Classification of the Index. See page 7.

Arbitration

Application d'une théorie du salaire moderne dans les manufactures (71322 D). F. Bayle. 35 pp. S I E—May, 1916. The Taylor system of wage payment in manufacturing plants.

REGULATION

Labor

Women Workers

The Employment of Women on Munitions of War (68454 A). Ills. 1500 w. Enr—Feb. 11, 1916. Information concerning success.

REGULATION

Arbitration

Rhode Island Wage Arbitration (65364). 2500 w. Elec Ry Jour—Oct. 30, 1915. Plea for reduction.

Wage Theories in Industrial Arbitration (70889 N). Wilson Compton. 19 pp. A E R—June, 1916. Arbitration precedents and principles.

Arbitration by Engineers Saves Time and Money in Sewer-Valuation Case (71978). Farley Gannett. 1800 w. E R—July 22, 1916. Board of three members reaches unanimous decision; Hanover, Pa.

British Metal Industries

Control of Mineral and Metal Industries Within the British Empire (70312 N). W. H. Trewartha-James. 2500 w. C M I, Bul—May, 1916. Suggestions.

Chemistry

Chemistry and the National Welfare (73810 B). Gen. William Crozier. 3000 w. J I I & E C—Oct., 1916. Legislation bearing on the utilization of private industries in time of war.

Conservation

Conservation and Economic Theory (67946 D). Richard T. Ely. 5500 w. A I M E, Bul—Feb., 1916. Broad philosophic basis.

Eight-Hour Day

Sudden Spread of the Eight-Hour Day (69283). Ruth Pickering. 2500 w. Survey—April 1, 1916. Testimony favorable.

Engineering Practice

The Legislative Control of Engineering Practice (70351). G. N. Houston. 2500 w. Cn E—May 11, 1916. Abstract of address before Calgary Branch Can. Soc. of Civ. Engrs., March 16, 1916.

Engineers' Examinations

Proposed Bill for State Board of Examining Engineers (68127 B); also discussion. 2500 w. Ind Eng Soc—1915.

Ethics

Report of the Committee on Professional Ethics and Standard Fees (72413 B). 5000 w. Iowa Eng Soc—Feb., 1916. Conditions needing correction discussed.

Federal Trade Commission

Cost Keeping and Industrial Prosperity (70613 A). Harry Franklin Porter. 4000 w. E M—June, 1916. How the Federal Trade Commission is striving to help industries.

Foundries

Pennsylvania Control of Foundry Operation (66305). 3300 w. Fnd—Dec., 1915. Summary of regulations governing casting plants.

Government Control

Control and Regulation vs. Government Ownership (65726). Theodore N. Vail. 2500 w. Telephony—Nov. 13, 1915. Extract from address at dinner given N. A. Ry. Com. Perfected organization.

Government Ownership

Failure of Government Ownership in Canada (71787). Samuel O. Dunn, in *Jl. of Pol. Ec.* 5000 w. R A G—July 14, 1916. Serial, 1st part. History of results of operation of the Intercolonial Ry.

I. C. C.

Annual Report of the Interstate Commerce Commission (66581). 5500 w. R A G—Dec. 17, 1915. Condensed abstract. Recommends enlargement of membership and extension of powers to meet increased demands.

Industry

The Division of the Product of Industry (72164 A). Hugh Bell. From a paper read before the United Workers. 5500 w. I & C T R—July 14, 1916. Study of economic conditions.

Labor

Congress and the Railways (73392). 1500 w. R A G—Sept. 22, 1916. Extract from Bul. No. 19, sent out by the Ry. Business Assn.

Hughes on the Adamson Act (73433). 1500 w. R R—Sept. 23, 1916. Address of Charles E. Hughes at Springfield, Ill., on the eight-hour act.

Importance of the Human Factor (73427). Fred H. Rindge, Jr. 2500 w. E & M J—Sept. 23, 1916. Importance of workers' character, efficiency and friendliness.

The "Eight-Hour" Law in the Political Campaign (73390). H. F. Lane. 3500 w. R A G—Sept. 22, 1916. Opinions of members of Congress, with the writer's comments on the action.

"The New Tyranny" (73391). Samuel O. Dunn. 2500 w. R A G—Sept. 22, 1916. Abstract of address before the Ry. Sig. Assn.

Decisions of Courts Affecting Labor: 1915. (71792 N). 320 pp. U S D L, No. 189—May, 1916.

Consult Classification of the Index. See page 7.

Labor Laws

New York Labor Laws of 1916 (72074 N). 65 pp. N Y D L—No. 78. Laws relating to labor enacted in 1916.

Importance of Cost Data on Day Labor Work (72552). Alvah E. Foreman. 4000 w. Mun JI—Aug. 17, 1916. Value of foreman in different lines of work.

A Brotherhood Interpretation of the Adamson Act (74088). 3000 w. R R—Oct. 21, 1916. Address by the General Chairman of the Brotherhood of Locomotive Trainmen and Engineers for the Penn. lines east.

Eight-Hour Day Commission Appointed (73869). H. F. Lane. 1800 w. R A G—Oct. 13, 1916. Appointments and outline of work.

Labor Problems in African Mines (73755 A). H. Foster Bain. Ills. 5000 w. M Mg—Sept., 1916. First of three articles considers the mental attitude of the natives toward mine work, and its influence on them.

President Ripley on the Adamson Wage Law (73801). 1400 w. R R—Oct. 7, 1916. The author's estimate of the significance of the legislation.

The Eight-Hour Law (73845). B. F. Bush. 2800 w. S L R C Pro—Sept. 8, 1916. Explanation of the controversy.

The Individual Contract in Indianapolis (73639). 3300 w. El R JI—Sept. 30, 1916. Account of the adoption two years ago.

The Labor and Capital Problem (74047). From circular of Nat. City Bank. 3000 w. E & M J—Oct. 21, 1916. Analysis of the Problem of distribution of wealth and income.

Labor Laws

Miscellaneous Labor Laws of New York State, 1916 (74198 N). 110 pp. N Y D L—Oct., 1916. Laws affecting labor which are not a part of the general Labor Law.

The Labor Law and the Industrial Code, With Amendments, Additions, and Annotations to July 1, 1916 (74197 N). 220 pp. For New York state. N Y D L—Oct., 1916.

The New York Workmen's Compensation Law (74241 N). 38 pp. N Y D L—Oct., 1916.

Labor Legislation

Labor Legislation of 1915 (69034 N). 490 pp. U S D L, No. 186—Dec., 1915. Review.

Legislation

Report of the Committee on Legislation (73412 B). 7000 w. Iowa Eng Soc—Feb., 1916. With discussions.

License Law

Structural Engineers' License Law of the State of Illinois (74134). 3500 w. E & C—Oct. 25, 1916. The law in full.

REGULATION**Natural Resources**

Report of Committee XIX—On Conservation of Natural Resources (68509 N). 3000 w. A R E A, Bul—Dec., 1915. Results abroad, in United States, and Canada.

Patent Law

The Need of a Change in the Patent Law (69552). James M. Hyde. 4500 w. M & S P—April 15, 1916. Constructive criticism.

Patents

Les brevets d'invention internationaux (65445 D). 40 pp. Soc Ing Civ Fr Mem—April-June, 1915. Series of discussions and letter on international patents.

A Better Knowledge of Patents for Inventors (65526 A). William D. Shoemaker. 2500 w. Jour Am Soc of Marine Draftsmen—Oct., 1915. Points in patent procedure.

Preparedness

Industrial Preparedness (74001 A). S. G. McMeen, with discussion. 4000 w. C E S JI—Sept., 1916. The work engineers are asked to do in making an inventory of industrial properties.

Preparedness—A Vital Necessity (73986 B). John P. Jackson. 21 pp. U S N I—Sept.-Oct., 1916. Why it is essential and what preparation should embrace.

Public Service Commissions

The Development and Importance of an Adequate Engineering Department for a Public Service Commission (67994 B). Walter A. Shaw. Also discussion. 5500 w. W S E, JI—Nov., 1915. Work of Commission outlined.

Public-Utilities

Regulation of Public Utilities (66033). Leonard A. Busby. 5000 w. Elec Ry Jour—Nov. 27, 1915. Difficulties of electric railway regulation; factors involved.

Franchises of Public Utilities as They Were and as They Are (66534 N). Henry C. Hodgkins. 5500 w. A W A—Dec., 1915. Utilities ordinarily within limits of municipality, and their adequate regulation.

Leonard Metcalf Suggests Improvements in Public Utility Control and Valuation (67559). 2500 w. E R—Jan. 22, 1916. From presidential address before New England Waterworks Assn.

State Regulation of Interstate Utilities Viewed from a New Angle (67862). Alfred P. Thom. 3000 w. E R—Feb. 5, 1916. Local control encroaches on rights of other states.

Historical Interpretation of the Wisconsin Law for the Regulation of Public Utilities (68294 A). R. C. Disque. 6000 w. Wis E—Feb., 1916.

Public Utilities

Public Works

The Evolution of Public Utilities (70608 A). George P. Roux. 4000 w. E M—June, 1916. Origin, development, and relation to society of such enterprises.

Reform and Regulation (71115 B). Alexander C. Humphreys. With appendix on Railroad Regulation, by Stuyvesant Fish. 9000 w. B S C E, JI—June, 1916. Discussion of the problem as related to public utilities.

State Inspection of Public Utilities (71199). C. M. Larson. 3500 w. Wis E—May, 1916. Outline of the regulation by the Wisconsin railroad commission.

Public Demands a Square Deal for the Utility (71535). 1500 w. El W—July 1, 1916. How the people of Idaho City protested against a proposed attack on the company.

Common Sense and Public Utilities (72236 A). Nathaniel T. Guernsey. 3500 w. T E—Aug., 1916. Fundamentals underlying regulation.

Public Service and the Corporations That Furnish It (72641 A). C. Loomis Allen. 3500 w. Ae—Aug., 1916. What utilities have done for the nation.

A Method of Determining a Reasonable Service Rate for Municipally Owned Public Utilities (73560 D). J. B. Lippincott. 3000 w. A S C E, Pro—Sept., 1916. Conditions in California. Rates should be fixed the same as privately owned utilities.

Discussion on "Reform and Regulation" (73359 B). D. C. Jackson, F. P. Stearns, A. R. Weed, J. P. Snow, S. E. Thompson and A. C. Humphreys. 14000 w. B S C E, JI—Sept., 1916.

See Power Development under ELECTRICAL ENGINEERING, *Generating Stations*, and Electricity, under ELECTRICAL ENGINEERING MISCELLANY.

Public Works

The Departmental Plan in Public Works (69420). C. E. Grunsky. Address at convention of Inland Waterways Assn. 2200 w. W E—April, 1916. Combining all engineering activities under one department.

The Necessity for a National Department of Public Works (71195 B). Isham Randolph, with discussion. 9500 w. E S W P, Pro—April, 1916. Discusses a bill to create such a department.

Railroads

The Railroads and the People (65954). William Sproule. Abstract of an address at the convention of the Am. Bankers' Assn., Seattle, Wash. 1800 w. Ry Age Gaz—Nov. 26, 1915. The public as investors; the interest of the employees.

Some Problems and Principles of Government Regulation of Railroads (67144). Emory R. Johnson. From paper before Pan-Am. Sci. Cong. 2500 w. R A G—

REGULATION

Jan. 7, 1916. Particularly experience and needs of United States.

The Public and the Railroads (69454). W. L. Park. 2500 w. S L R C, Pro—March 10, 1916. Broad discussion.

Railway

Government Regulation of Railway Operation (72591 A). Samuel O. Dunn. 15 pp. W R C, Pro—May 16, 1916. What has been accomplished and wherein it has failed.

Railway Regulation

Railway Regulation Causes Locomotor Ataxia (71951). Frank Trumbull. 3500 w. R A G—July 21, 1916. Address at Cedar Point, O. Lack of co-ordination in present system. National control the remedy.

Railways

Government Regulation of Our Railroad Systems (68014). Oscar W. Underwood. 2500 w. R A G—Feb. 11, 1916. Abstract of Chicago address. What Congressional investigation should accomplish.

The Relations of the Railways and the Public (67995 B). L. E. Johnson. Also discussion. 12000 w. W S E, JI—Nov., 1915. Problem of regulation.

Government Regulation and Our Transportation Systems (68423 A). Oscar W. Underwood. Address at dinner of Am. Elec. Ry. Assn., Chicago, Feb. 4, 1916. 3000 w. G E R—March, 1916. Safety affected by insufficient earnings.

Railway Strike

Maintaining and Fostering Public Utility Development Under Regulation (72994). Edwin D. Dreyfus. 4500 w. El JI—Sept., 1916. Advantages.

Railway Strike Averted by Legislation. Also editorial (73058). 11500 w. R A G Sept. 8, 1916. Law for eight-hour day.

Standardization

Standardization and Its Assistance to the Engineering Industries (73300 A). Read before the British Assn. 4000 w. Eng—Sept. 8, 1916. General views on standardization, the Engineering Standards Committee, its inception and growth.

Strikes

Organization Allowed—Union Not Recognized (72448). 4000 w. El R JI—Aug. 12, 1916. Terms of strike settlement in New York.

Taxation

The Natural Taxation of Mineral Land (65394). R. B. Brinsmade. 4400 w. Min & Sci Pr—Oct. 30, 1915. Practical proposals.

Telephones

Service Cost of Telephones Described by Commission (66618). 5000 w. Tly—Dec. 18, 1915. Serial, 1st part. Decision of Wisconsin R. R. Commission.

Trade Unions

WELFARE AND SAFETY

Automobiles

Trade Unions

Trade Unionism and the Common Good (71201 A). E. T. Good. 4000 w. C E M—June, 1916. Methods to meet conditions during and after the war.

Wage Controversy

Conferences on Railway Wage Controversy (72679). 4500 w. R A G—Aug. 25, 1916. Officers in conference with the President on plan to avert strike.

Wages

Union Scale of Wages and Hours of Labor, May 1, 1915 (71793 N). 290 pp. U S D L, No. 194—May, 1866.

Water

Laws and Regulations Regarding the Use of Water in Pan-American Countries (68886 N). Rome G. Browne. 72 pp. Pan-Am Sci Cong—1915-16. Resume in Spanish and English.

The People's Interest in Water-Power Resources (68483 N). George Otis Smith. Read before 2nd Pan-Am. Cong. 3000 w. U S G S, Water-Sup paper 400-A—Jan. 10, 1916. Basis for control and importance of utilization.

Water Power

No Federal Curb on Western Power Development (65538). O. C. Merrill.

Extracts from address at Portland, Ore. 1800 w. Eng News—Nov. 4, 1915. Developed far in advance of market.

The Peoples Interest in Water-Power Resources (67378 N). George Otis Smith. 3000 w. U S G S, Water Supply paper 400-A—Jan. 10, 1916. Government regulation and protection.

Water-Power Bills Now Pending in Congress (70956). 2500 w. El R & W E—June 10, 1916. Comparison of measures being considered.

Water Supplies

Control of Public Water Supplies by the Conservation Commission of the State of New York (67402 D). Russell Suter. Also discussion. 6500 w. N E W W A JI—Dec., 1915. Work accomplished and future possibilities.

State Control of Kansas Water Supplies (68388). C. A. Haskins. 1500 w. Mun JI—Feb. 24, 1916. Powers and duties of the State Board of Health.

Water Use

Laws and Regulations Regarding the Use of Water in Pan-American Countries (70013 A). Rome G. Brown. 10000 w. G E R—May, 1916. Laws governing development of water power.

WELFARE AND SAFETY

Abrasive Wheels

Safety Code for the Use and Care of Abrasive Wheels (67868 A). 2500 w. A S M E, JI—Feb., 1916.

Some Dangers in Dry Cleaning (67755 N). 7 pp. T S—Jan., 1916. Precautions.

Accident Prevention

The Prevention of Industrial Accidents (65848 A). Albert S. Regula. 2000 w. Cornell Civ Engr—Nov., 1915. Causes, educational work, safeguarding, etc.

Industrial Safety and Principles of Management (66190 A). W. P. Barba. 5000 w. A S M E JI—Dec., 1915. Problems and their solution.

The Attitude of the Employer Towards Accident Prevention and Workmen's Compensation (69294 A). W. H. Cameron, with discussion. 3500 w. A S M E, JI—April, 1916. Present tendencies.

Modern Movement for Safety from Standpoint of Manufacturer (69293 A). Melville W. Mix. Also discussion. 2500 w. A S M E, JI—April, 1916. Need of personal interest.

Accidents

Accidents du travail (68857 C). J. A. Mireault. 11 pp. R T C—Feb., 1916. General discussion of safety in industry.

Accident Prevention and Adjustment (74064). 12000 w. El R JI—Oct. 21, 1916. Abstracts of papers and written

discussions before Claims Assn. in Atlantic City, Oct. 9-12.

Highway Crossing Accidents — Their Cause and How They Can Be Reduced (74089). John S. Rockwell. 2200 w. R R—Oct. 21, 1916. From paper read at Detroit. Methods by which they may be eliminated.

Air Compressors

Safeguarding Air Compressors (65963 A). W. P. Eales. 1500 w. Safety Engng—Nov., 1915. Suggestions to prevent accidents.

Safeguarding Air Compressors (66252 N). 4 pp. T S—Dec., 1915. Hazards and protection against them.

Ammunition Making

Fire Hazards of Ammunition Manufacture (72759 A). W. B. Milne. 6500 w. Sf E—Aug., 1916. Discusses elements in the risk, measures of protection, etc.

Asphyxiation

"Petromortis" (70135 N). 7 pp. T S—May, 1916. Dangers from breathing products of combustion.

Benzol (70137 N). 6 pp. T S—May, 1916. Nature, hazards of poisoning and explosion.

Automobiles

The Contributions of the Automobile Engineer to the Movement for Public Safety (66363 B). K. W. Zimmerschied.

Consult Classification of the Index. See page 7.

Blast Furnaces

2500 w. S A E Bul—Nov., 1915. Aiming at safety in traffic.

Blast Furnaces

Sicherheitsvorkehrungen bei Hochfenschrägaufzügen (66225 B). Rudolf Brennecke. Ills. 2000 w. St u E—Nov. 18, 1915. Serial, 1st part. Safety devices around the blast-furnace hoist.

Box Making

Paper-Box Manufacture (69635 N). Ills. 8 pp. T S—Apr., 1916. Protection of machines.

Carnegie Steel

Features of Welfare Work at Duquesne, Pa. (67417 A). Ills. 1500 w. I A—Jan. 20, 1916. Children's playgrounds, apprentice school, etc.

Chains

Chains and Other Lifting Gear (67328 A). G. S. Taylor. 3500 w. Qry—Jan., 1916. Causes, and means of preventing, accidents.

Clubs

Industrial Clubs (71352 A). W. W. Davidson. Ills. 1500 w. E M—July, 1916. Social and athletic organization and the benefits.

Coal and Coke

"Safety First" in Coal Mine and Coke Plant (69074 A). Ills. 2000 w. I A—March 23, 1916. Welfare work of H. C. Frick Coke Co., Pittsburgh.

Coal Mining

Inspector's View of Mine Safety (69835). Nicholas Evans. 2000 w. Cl A—April 22, 1916. Evidences of good and bad management.

Coal-Mine Fatalities in the United States, 1915 (70267). Compiled by Albert H. Fay. 75 pp. U S B S—March, 1915. With list of permissible explosives, lamps, and motors tested prior to Jan. 1, 1916.

"Safety First" in Coal Mines (71305). A. C. Watts. 4000 w. U S E—May, 1916. Lines of effort for safe mining.

Coal-Mine Fatalities in the United States, 1870-1914, with Statistics of Coal Production, Labor, and Mining Methods, by States and Calendar Years (70870 A). Albert H. Fay. Ills. 355 pp. U S B M—Bul. 115.

Monthly Statement of Coal-Mine Fatalities in the United States, March, 1916 (70871). Albert H. Fay. 20 pp. U S B M—May, 1916. With list of permissible explosives, lamps, and motors tested prior to May 1, 1916.

Safety and Efficiency in Coal Mining (72087). Edward H. Cox. 4000 w. Cl A—July 29, 1916. Requisites for safety and efficiency.

WELFARE AND SAFETY**Elevators****Coke-Oven Accidents**

Coke-Oven Accidents in the United States During the Calendar Year 1915 (72132). Albert H. Fay. 13 pp. U S B M—Tech paper 151.

Coke Ovens

Safety in Coke-Oven Operation (74180). K. M. Burr. 2200 w. Cl A—Oct. 28, 1916. Advocates permanent employment, education, and selection of workmen.

Cranes

Safety in Crane Chain Practice (65962 A). Earl B. Morgan. 2500 w. Safety Engng—Nov., 1915. Points to be observed to secure maximum safe conditions.

Cripples

Armersatz für kriegsbeschädigte Handwerker und Arbeiter (65473 B). Kesten. Ills. 1500 w. Z V d I—Oct. 23, 1915. Device to replace arm lost in battle.

Motion Study for the Crippled Soldier (66186 A). Frank B. Gilbreth. Ills. Discussion. 4500 w. A S M E JI—Dec., 1915. Investigations of lines of work open to various types of cripples.

Der heutige Stand der Herstellung künstlicher Gliedmassen (66227 B). F. Tiessen. Ills. 5000 w. Z V d I—Nov. 20, 1915. Present practice in the making of artificial limbs.

L'enseignement professionnel des blessés de la guerre (69672 B). V. Forbin. Ills. 1200 w. La Nt—Apr. 5, 1916. Industrial education of war cripples.

See same heading under *Education*.

See also Artificial Limbs under *MECHANICAL ENGINEERING, Miscellany*.

See Magnetic Hand under *MECHANICAL ENGINEERING, Miscellany*.

Electrical

"Safety First" Between Telephone and Power Wires (67302). F. W. Tenney. 2000 w. Tly—Jan. 15, 1916. What California rules are intended to prevent.

Electrical Plane

Safety and Welfare Work in an Electrical Plant (65342 A). Chester L. Lucas. Ills. 2500 w. Mach, N Y—Nov., 1915. Activities at the Pittsfield, Mass., plant of the General Electric Co.

Elevator Accidents

Elevator Accidents and Their Causes (67067). F. G. Nugent. 2000 w. Sf E—Jan., 1916. Points requiring attention.

Elevator Hazards

Elevator Hazards and Their Elimination (72067 A). R. W. Hicks, Jr. 4500 w. Sf E—July, 1916. Lecture before Lewis Inst., Chicago.

Elevators

Elevator Hazards (68705 A). John Wright. 2500 w. E S P, JI—Feb., 1916.

Employees' Organization**WELFARE AND SAFETY****Lead Poisoning****Employees' Organization**

Mutual Beneficial Association on the Pennsylvania (66368). N. F. Dougherty. 3000 w. R A G—Dec. 10, 1915. Organization of employees without walking delegates or strike-clause in by-laws.

Factory Lighting

See Factories under ELECTRICAL ENGINEERING, *Illumination*.

Fire Protection

Fire Prevention and Fire Protection (69673 A). Ills. 40 pp. A I & S I, Bul—Feb., 1916. Methods of various companies outside the Steel Corporation.

Fire Insurance and Protection from Fire (71518 A). Maynard M. Metcalf. 1600 w. S M—July, 1916. Need of experimental study of fire prevention.

Forging

Forging and Hammering (70133 N). 4 pp. T S—May, 1916. Fourth paper in series: Safety in the Machine Shop.

Foundries

Safety First Around Molten Metal (69288). R. R. Clarke. 3300 w. Fnd—April, 1915. Suggestions and precautions.

Foundry Risks and Remedies (69715 A). A. R. Bartlett. Read before the British Found. Assn. 2000 w. Mch W—April 7, 1916. Serial, 1st part. Carelessness.

New Safety Code Adopted by National Founders (70071). 2500 w. Fnd—May, 1916. Rules.

Foundry Ventilation

Ventilation (65994 N). Ills. 1500 w. N F A Saf Bul—Nov. 1, 1915. Importance of sufficient air in foundry work and methods of obtaining it.

Grinding

Safety Code for the Use and Care of Abrasive Wheels (66572 N). 2500 w. A S M E—Dec., 1915. Code submitted for consideration of Society.

Gasoline

Hazards in Handling Gasoline (67374 N). George A. Burrell. 3000 w. U S B M—Tech. paper 127. Precautions needed.

The Ignition of Gasoline by Electricity (70134 N). 4 pp. T S—May, 1916. Dangers from static electricity.

Gasoline, Chamois and Sparks (70563 A). Arthur W. Ewell. Ills. 500 w. W P I, JI—May, 1916. Investigations showing sparks not produced.

Health

The Health of Old Colliers (73328 N). J. S. Haldane, with discussion. 5500 w. I M E, Trans—Aug., 1916. Reasons for the continued high death-rate.

Heating Boiler

Explosion of a Heating Boiler (67753 N). Ills. 5 pp. T S—Jan., 1916. Analysis of disastrous accident.

Hoisting

Safety for Hoist Engineers (74050). Harry E. Scott. 1000 w. E & M JI—Oct. 21, 1916. Many accidents caused by carelessness.

Hookworm

Hookworm Disease Among Miners (69404). Rush M. Hess. Ills. 1700 w. M & S P—April 8, 1916. History, effects, prevention.

Housing

Housing Reform: with Special Reference to the Housing Problem in Birmingham (65455 A). Charles A. Wareing. 9 pp. Inst San Engrs Jour—Oct., 1915. General review.

Some Conclusions on Housing Our Workers (69657 B). Ills. 17 pp. I M C E, JI—Apr. 1, 1916. Progress in England.

Human Factors

The Human Factors in Industrial Safety (70562 A). John Calder. 6000 w. Sf E—May, 1916. Progress evidenced in safety work.

Industrial Diseases

On Some Diseases of the Respiratory Organs Incidental to Miners, as Portrayed by Dr. Agricola, in A. D. 1550 (72147 N). J. de Fenton. 4000 w. C M M S S A—May, 1916. History of miners' phthisis.

Industrial Diseases of Iron and Steel Workers in Middlesbrough (72697 A). J. Watkin Edwards. 2500 w. I & C T R—Aug. 11, 1916. Diseases of this class and their causes.

Industrial Hygiene

Health Conservation at Steel Mills (73453). J. A. Watkins. 30 pp. U S B M—Tech. paper 102. Recommendations on methods of minimizing causes of lowered efficiency.

Injuries

Electrical Hazard (73961 N). W. T. Snyder. 900 w. A I S E E—June, 1916. Peculiar hazards of electrical work.

Labor

Le Travail Human—Son Étude Scientifique (73518 B). Louis Bourgoin. 6400 w. R T C—Aug., 1916. Scientific analysis of human labor from the physiological viewpoint.

Cost of Health Supervision of Employees (74018 A). Magnus W. Alexander. 1000 w. I A—Oct. 19, 1916. Results of an investigation of annual cost in industrial establishments.

Lead Poisoning

Report of British Departmental Committee on the Danger in the Use of Lead

Consult Classification of the Index. See page 7.

Lighting

in the Painting of Buildings (70261 N). 200 pp. U S D L, No. 188—March, 1916.

Lighting

See Factories under ELECTRICAL ENGINEERING, *Illumination*.

Lightning Protection

Protection of Life and Property Against Lightning (67347 N). O. S. Peters. Ills. 125 pp. U S B S, No. 56—Dec. 15, 1915. Information encouraging use of rods.

Lumber Piling

Piling Lumber (69634 N). Ills. 5 pp. T S—Apr., 1916. Hazards and precautions.

Machine Shops

Safety Organization of a Machine Shop (65341 A). Luther D. Burlingame. Ills. 4000 w. Mach, N Y—Nov., 1915. Accident prevention.

Malaria

Engineering Operations for the Prevention of Malaria (69799 N). Frank Dudley Evans. Ills. 60 pp. I C E, No. 4145—Feb. 9, 1915. Causes and remedies.

Material Handling

Material-Handling Hazards (70276 A). Earl B. Morgan. Ills. 4500 w. Sf E—April, 1916. Fundamental principles; careless practices.

Metal-Mine Accidents

Metal-Mine Accidents in the United States During the Calendar Year 1914 (69036). Albert H. Fay. 94 pp. U S B M—Tech paper 129. Statistics and analyses.

Accident Prevention at Ontario Mines (68415 N). T. F. Sutherland. 3000 w. C M I, Trans—1915. Methods of different companies.

Safety Work at the Canadian Copper Company's Mines and Smelter (68414 N). E. T. Corkill. 1500 w. C M I, Trans—1915.

Mine Accidents

Chief Sources of Accidents in the Witwatersrand Mines (67923 N). Charles E. Hutton. Also discussion. 9500 w. C M M S S A, JI—Nov., 1915. Classification.

Mine Housing

Locust Mountain Village (68391). C. M. Young. Ills. 1500 w. Cl A—Feb. 26, 1916. Unusual construction.

From "Bohunks" to Finns (69282). C. Whit Pfeiffer. Ills. 4500 w. Survey—April 1, 1916. Social conditions on Mesabi range with workers of many nationalities.

Mining

Safety and Efficiency in Coal Mining (72704). John Lloyd. Ills. 1600 w. Cl A—Aug. 26, 1916. What has been done to make mines safer.

WELFARE AND SAFETY**Public Utilities**

The Encouragement of First Aid Work on the Mines: Some Suggestions Based on Experience at the Crown Mines (72570 N). A. J. Brett, with discussion. 6000 w. C M M S S A, JI—June, 1916.

Central Safety Stations in Coal Mines (72760 A). H. M. Wilson. Ills. 1800 w. Sf E—Aug., 1916. Changes brought about by compensation legislation. Safety measures, safeguards, etc.

Mine Safety

How Mine Safety Is Increased by Compensation Laws (74045). Herbert M. Wilson. 2000 w. Cl A—Oct. 21, 1916. Abstract of address in Detroit to the National Safety Council.

Municipal Engineers

The Duties of a Municipal Engineer and Surveyor in Connection with Factories and Workshops (69658 B). Frederick Sadler. 10 pp. I M C E, JI—Apr. 1, 1916. Regulations re safety and sanitation.

Nystagmus Diseases

Miners' Nystagmus (70594). Frederick L. Hoffman. 52 pp. U S B M—Bul. 93. Reviews results of investigations in Europe.

Occupational Diseases

Pulmonary Disease Among Miners in the Joplin District, Missouri (65753 N). A. J. Lanza and Edwin Higgins. Ills. 35 pp. Its relation to rock dust in the mines.

Industrial Poisons Used in the Rubber Industry (65754 N). Alice Hamilton. Ills. 56 pp. U S Dept of Labor—Bul 179. Processes used and their dangers.

European Regulations for Prevention of Occupational Diseases (68898 N). 75 pp. N Y D L—No. 76. Metal poisonings, dusts, gases.

How a Miner Can Avoid Some Dangerous Diseases (69140 N). A. J. Lanza and Joseph H. White. Ills. 20 pp. U S B M—Miners' Circ. 20. Rules for preventing.

Latest Features in the Diagnosis and Prevention of Some of the Occupational Poisonings (73323 A). W. H. Rand. 1800 w. A JI P H—Aug., 1916. Reviews recent work.

Painters' Scaffolds

A Safety Device for Painters' Scaffolds (65499 N). Ills. 6 pp. Trav Std—Nov., 1915. Safeguard to prevent falling.

Public Utilities

Some Hazards and Safety Suggestions in Connection with Construction, Inspection and Maintenance of Public Utilities (67032 N). H. W. Mowery. Ills. 20 pp. Am Museum Safety—Jan., 1916.

Quarrying**Quarrying**

Quarry Accidents in the United States During the Calendar Year 1914 (67375 N). Albert H. Fay. 40 pp. U S B M—Tech. paper 128. Statistics.

Railroads

The State's Responsibility for Loss of Life (69356). L. T. Loree. 1000 w. R A G—April 7, 1916. Need of legislation to prevent trespassing on railways.

The Safety Appliances Inspector's Report (67298). 2500 w. R R—Jan. 15, 1916. Serial, 1st part. From report of Chief Inspector Belknap to the Interstate Commerce Commission.

Refrigeration

The Massachusetts Ammonia Safety Regulations (66039). Frank L. Fairbanks. Ills. 8000 w. Power—Nov. 30, 1915. Regulation affecting the use of ammonia gas in refrigeration systems.

Rescue Apparatus

Oxygen Mine-Rescue Apparatus (74174). E. Steidle. 2200 w. E & M J—Oct. 28, 1916. The apparatus used in the United States and the work of the U. S. Bureau of Mines.

Rescue Work

Rescue and Recovery Operations in Mines After Fires and Explosions (73899). James W. Paul and H. W. Wolfen. 90 pp. U S B M—Oct., 1916. Suggestions and advice.

Safeguarding.

Principles of Safeguarding (73759 A). Robert J. Young. 1800 w. Sf E—Sept., 1916. Considered particularly with reference to mechanical appliances.

Safety Code

Report of the A. F. A. Committee on Safety and Sanitation (72906 N). 10 pp. A F A—Sept., 1916. Proposed A. F. A. safety code.

Safety Council

Annual Congress of National Safety Council (74150). 6500 w. R A G—Oct. 27, 1916. Fifth annual review.

Safety Engineering

Safety Engineering (68549 N). Frederick Remsen Hutton. Ills. 28 pp. Also discussion. Int Eng Cong, Trans—Paper 129.

Safety Engineers

The Successful Safety Engineer (73758 A). George Gilmour. 4500 w. Sf E—Sept., 1916. Address before Am Soc of Sf Engs. Essential qualifications.

Safety Lamps

Notes on the History of the Safety Lamp (73884 N). F. W. Hardwick and L. T. O'Shea. Ills. 150 pp. I M E Trans—Sept., 1916.

Safety Standardization

Standardization of Safety Principles (66576 N). Carl M. Hansen. Ills. 3000

WELFARE AND SAFETY**Welfare Work**

w. A S M E—Dec., 1915. Discusses requisites.

Standardization of Safety Principles (69292 A). Carl M. Hansen. Also discussion. 6500 w. Ills. A S M E, JI—April, 1916. Principles and application.

Sand Blasting

Sand-Blasting and Other Dusty Operations (65464 N). Ills. 1200 w. N F A Saf Bull—Oct., 1915. Precautions for protecting workmen.

Sanitation

See Efficiency, under *Management*.

Shop Hygiene

Conserving the Worker's Health and Energy (69305 A). F. B. & L. M. Gilbreth. 3000 w. I A—April 6, 1916. Fatigue.

Social Relations

Social Relations of Electric Railways (74065). 8000 w. El R JI—Oct. 21, 1916. Progress report on important problems. Protection of employees through life, health, and accident insurance.

Social Work

Social Welfare (72730 A). W. H. Blanchard. 2800 w. A S M D, JI—July, 1916. Methods aiming to improve the conditions of workmen.

Steel Plants

Safety Rules for Iron and Steel Plants (68486 A). 4500 w. I A—March 2, 1916. Proposed code of Ohio Industrial Commission.

Street Railways

Welfare Work (66050 A). Jesse W. Lilienthal. 5500 w. G E R—Dec., 1915. Address before Am. Elec. Ry. Assn. Code of commandments.

Safety a Real Economy in Columbus, Ohio (69838). 3500 w. El R JI—April 22, 1916. Organization and work that gave results.

Theaters

Designing for Safety in Theaters (69174 A). A. H. Gentry. Ills. 3500 w. S f E—March, 1916.

Typhoid

See same heading under CIVIL ENGINEERING, *Water Supply*.

Vibration

See same heading under CIVIL ENGINEERING, *Construction*.

Water Tanks

See same heading under CIVIL ENGINEERING, *Construction*.

Welfare

Human Engineering (73935). Arthur T. Morey. Ills. 2500 w. R R—Oct. 14, 1916. Fellowship work in manufacturing.

Welfare Work

A Study of Safety and Welfare Work in Manufacturing and Selling Organiza-

Consult Classification of the Index. See page 7.

Workmen's Compensation

tions (65340 A). Forrest E. Cardullo. Ills. 35000 w. Mach, N Y—Nov., 1916. Study of all phases of the work.

Co-operative Activities of Railway Employees (73066). Bert Hall. Ills. 2000 w. El R JI—Sept. 9, 1916. Welfare work, particularly in Milwaukee.

The Welfare of Munition Workers (73296 A). Ills. 1500 w. Eng—Sept. 8, 1916. Method adopted by Messrs. Vickers.

Workmen's Compensation

Workmens Compensation (66850 A).

MISCELLANY**Engineering Problems**

W. S. Diggs. 22 pp. R C P—Nov. 22, 1916. From standpoint of insurance underwriters. Also discussion.

Workmen's Compensation Law and Mine Safety (66862). H. M. Wilson. 5500 w. Cl A—Jan. 1, 1916. Methods of determining rates.

Compensation Legislation of 1914 and 1915 (67381 N). 390 pp. U S Dept Lab, No. 185—Oct., 1915. Analysis of principal features of laws, and related information.

MISCELLANY**Belgium**

The Great Industries in Belgium Before and During the War (67668 A). H. Hubert. Map. 2500 w. Enr—Jan. 14, 1916. Serial. 1st part.

Bureau of Standards

The Work of the National Bureau of Standards (66262 A). S. W. Stratton. 49 pp. E C D Pro—Oct., 1915. General description with discussion.

Chemical Industry

Progress in the Chemical Development of the South (73130 A). David T. Day. 2500 w. M Rd—Sept. 14, 1916. The resources which could be utilized in chemical industry.

The Development of Chemical Industries in the South and Southwest (73133 A). William B. Phillips. 5000 w. M Rd—Sept. 14, 1916. Seven factors which are to determine the extent of development.

The Rosin and Turpentine Industry, and the Chemist (73132 A). John E. Teeple. 3000 w. M Rd—Sept. 14, 1916. Chemical contributions to the industry.

Chemical Trade

The Chemical Trade and the War (65638 A). 2500 w. Engr, Lond—Oct. 22, 1915. Chemicals in demand and the supply.

Chemistry

Applied Chemistry (65515). L. H. Baekeland. Address to Am. Chem. Soc. 4500 w. Sci Am Sup—Nov. 6, 1915. Relation to manufacturers.

Co-ordination

Co-ordinated America Demands Participation of Engineers (74055). Thomas C. Desmond. 2500 w. E R—Oct. 21, 1916. Need for engineers to take an active part in politics.

Dutch Navigatoins

De scheepvaartverbindingen van Amsterdam van Rotterdam met de zee gedurende de laatste honderd jaren (74211 B). W. K. Behrens. Serial, 1st part.

4300. Ing—Sept. 23, 1916. Sea-borne traffic between Amsterdam and Rotterdam during the last hundred years.

Dye Industry

The Dyestuff Famine (65511). Thomas H. Norton. Ills. 3000 w. Sci Am—Nov. 6, 1915. Serial, 1st part. Causes and cure.

The Dyestuff Situation (65519). 4000 w. Met & Chem Engng—Nov. 1, 1915. Papers and discussion before the N. Y. section of Society of Chemical Industry.

Dyestuffs

Dyestuff Situation in the United States at the Close of 1915 (67761 N). Thomas H. Norton. 6500 w. J I I E C—Feb., 1916. Plants in operation; probable development. Paper before Amer. Chem. Soc.

Economic Resources

Address of President of the Institution of Civil Engineers (69811 N). Alexander Ross. 20 pp. I C E—Nov. 2, 1915. England's national resources.

Economics

The Economic Masters of the World (70951). Victor Cambon. 2000 w. M Rd—June 8, 1916. Address on American Industry before Am. Chamber of Commerce, Paris, France.

Engineering Industry in the Economic War (70844 A). M. T. C. Elder. 1800 w. Eln—May 19, 1916. The future necessity of discrimination in trade.

Efficiency

Efficiency (69193 A). H. M. Hobart. Curves. 5000 w. G E R—April, 1916. Electrical machinery, steam and electric locomotives, transformers, and man.

Engineering Problems

Mr. Gerald Stoney's Address to the Engineering Section of the British Association (73291 A). 4000 w. Eln—Sept. 8, 1916. Problems affecting engineering and allied industries.

Consult Classification of the Index. See page 7.

Engineer's Status**Engineer's Status**

The Broader Duties of the Engineer (67386 A). J. C. Ralston. 4500 w. A E S JI—Dec., 1915. Past and present achievements and future outlook.

The Future of the Engineering Profession (67548 A). Elliott H. Whitlock and Albert J. Hines. 8500 w. C E S JI—Jan., 1916. Discussion of inter-relations of engineering and technical societies. Also general discussion.

Der Ingenieur als Förderer der Volksbildung (67703 B). A. v. Rieppel. 3500 w. Z V d I—Jan. 1, 1916. Function of engineer in progress of society.

Engineering Questions (68343 A). Percy Griffith. 4500 w. S M C E—Feb. 11, 1916. Inaugural address to Soc. of Engrs.

The Relation of the Architect to the Engineer (68854 N). W. C. Armstrong. 5000 w. C E S St P Bull—Mar., 1916. Legal points; license laws, etc.

Engineering Co-Operation (68895). C. E. Drayer. 1800 w. E & C—March 29, 1916. Efforts being made to secure co-operation and improve standards.

Impressions of an Engineer in Public Office (68683 B). Morris Llewellyn Cooke. 6000 w. E C P, Pro—Jan., 1916.

England

The New Engineering Industry (73532). 2000 w. T E S—Aug. 25, 1916. Discussino of industrial changes in England as a result of war.

Exhibitions

The Smithfield Club Show (66693 A). Ills. 3500 w. Enr—Dec. 10, 1915. Serial, 1st part. Describes exhibits.

Expert Testimony

Expert (or Opinion) Testimony in Rate Valuation Cases (67575 N). John H. Gray. 12 pp. Util Mag—Jan. 1916.

Explosives

Production of Explosives in the United States During the Calendar Year 1915 (72130). Albert H. Fay. 20 pp. U S B M—Tech paper 159.

Exporting

How to Sell to Latin America (65985 A). Alex. Del Mar. Ills. 3500 w. Engng Mag—Dec., 1915. Authoritative discussion of conditions governing projected attempt to promote commerce.

Selling Railway Supplies to European Countries (65708). Walter S. Hiatt. 4000 w. Ry Age Gaz—Nov. 12, 1915. Methods to overcome prejudices.

South Africa's Interest in the South American Markets (65319). J. F. K. Brown. Ills. 5500 w. Coal Age—Oct. 30, 1915. Competition in coal trade.

A United States United for Trade in Foreign Lands (67142). Walter S. Hiatt.

MISCELLANY**German Commerce**

4000 w. R A G—Jan. 7, 1916. Importance of organization for export business.

The Great Pan-American Opportunity (68328 A). Dr. John Barrett. 5000 w. E M—March, 1916. Actual situation.

Probable Changes in the Foreign Trade of the United States Resulting from the European War (69076 N). Emory R. Johnson. Also discussion. 13500 w. A E R—March, 1916. Development of export.

Fertilizers

The Commercial Fertilizer Industry in the United States (73355 B). Lester W. Tucker. Ills. 3500 w. B S C E, JI—Sept., 1916. Method by which phosphate rock is changed to commercial fertilizer.

The Fertilizer Industry, Developed by Chemistry, and Its Relation to Agriculture (73144 A). F. B. Carpenter. 3000 w. M Rd—Sept. 14, 1916. Scientific application of artificial fertilizers.

The Relation of Water Power to Crop Production (73129 A). Frank S. Washburn. 6000 w. M Rd—Sept. 14, 1916. Value of artificial fertilizers.

Forestry

Forestry in Pennsylvania (73871 A). N. R. McNaughton. Ills. 1500 w. E S P JI—Aug., 1916. Serial, 1st part. First of nine articles on forest problems of this state.

Foreign Investment

American Engineers Enter the Foreign Field (67092 A). Ills. 3500 w. E M—Feb., 1916. Outlines the plans of the Am. International Corporation for promoting American trade.

French Industry

L'organisation scientifique de notre oeuvre économique dans nos colonies et dans la Métropole (70194 B). Henri Junelle. 4000 w. R G S—April 30, 1916. Suggestions on scientific organization of French colonial and metropolitan industry.

Fuel

The World's Supply of Fuel and Motive Power (65785 A). Dugald Clerk. Thomas Hawksley lecture. Inst. of Mech. Engrs. (Abstract.) 1200 w. Engr, Lond—Nov. 5, 1915. Requirements of fuel and power in industrial civilization.

Gas Lighting

Gas Lighting in Industrial Plants (73575 A). Thomas Scofield. Ills. 5000 w. E M—Oct., 1916. When properly installed provides adequate illumination at low cost.

German Commerce

Le marine de commere Allemande (65451 B). Victor Cambon. Ills. 2800 w. La Nt—Oct. 16, 1915. Survey of German merchant marine.

Consult Classification of the Index. See page 7.

Germany

MISCELLANY

National Defense

Germany

What of German Industrial Conditions (67561 A). C. A. Tupper. Ills. 2500 w. I A—Jan. 27, 1916. Effects of war on various industries. Lessons to be learned by America.

Incomes

Incomes of Engineering Graduates (69683 N). C. H. Benjamin. Ills. 15 pp. Soc Pro Eng El, Bul—Apr., 1916.

Industrial Chemistry

The Past and Future of Industrial Chemistry (72693 A). 1500 w. Enr—Aug. 11, 1916. Serial, 1st part. Reviews past influence of chemistry on the industries, and future expectations.

The Engineer and the Chemist (72779). F. G. Donnan. 3800 w. T E S—July 28, 1916. Necessity of co-operation between theorist and practical chemist pointed out.

Industrial Preparedness

Taking a Census of Industry for Preparedness (67556). 1000 w. E R—Jan. 22, 1916. Editorial on the President's request that engineers make an industrial census of the United States.

Industrial Lessons from the German War Machine (67091 A). C. E. Knoepfel. 5500 w. E M—Feb., 1916. Study of accomplishments of German military leaders during last eighteen months.

Industrial Lessons from the German War Machine (68331 A). C. E. Knoepfel. 3500 w. E M—March, 1916. Principles on which success was built.

Industrial Lessons from the German War Machine (69182 A). C. E. Knoepfel. 4500 w. E M—April, 1916. Third article of series. German industrial methods.

The European War and Industrial Democracy (68421 A). Joseph E. Davies. 4000 w. G E R—March, 1916. Review. Address before Am. Mfr. Export Assn. What must be done.

Industrial Lessons From the German War Methods (69953 A). C. E. Knoepfel. 7000 w. E M—May, 1916. Fourth and concluding article of a series.

Inventions

Presentation of Perkin Medal to L. H. Baekeland (67467). 16000 w. M & C E—Feb. 1, 1916. Presentation speech by Dr. Chandler; acceptance by Dr. Baekeland, discussing chemical patents and inventions.

Labor Legislation

Dangerous Labor Legislation Now Before Congress—A Call for Prompt Action (69176 A). John R. Dunlap. 4500 w. E M—April, 1916. Editorial on proposed Tavenner Bill, with letters favoring scientific management and opposed to the enactment of the bill.

Law and Engineering

Law and Engineering—Some Points of Contact (65469 B). Sydney G. Turner. 28 pp. Soc Engrs, Jour—Oct., 1915. With discussion.

Load Factor

A Third Factor in the Variation of Productivity: the Load Factor (66514 N). G. P. Watkins. 13500 w. A E R—Dec., 1915. Place of concept in economics.

Mathematics of War

Il problema tecnico matematico della guerra attuale e l'Italia (67063 B). G. Belluzzo. Ills. 4500 w. M T—Dec. 20, 1915. Mathematical formulas and curves applicable to the war.

Merchant Marine

The Merchant Marine from a Southerner's Viewpoint (65525 A). William Gatewood. 4500 w. Am Soc of Marine Draftsmen, Jour—Oct., 1915. Advantages of a country controlling its own carrying trade.

The American Merchant Marine—Recreation of a Vast New Industry (66283 A). John R. Dunlap. 1500 w. E M—Jan., 1916. Shipbuilding progress in America.

The Pressing Need for a Merchant Marine (66284 A). Stuart G. Gibboney. 2000 w. E M—Jan., 1916. Relief measures needed for American exporters.

The Imperative Need for Ships Owned by Americans (67090 A). William C. Redfield. 3000 w. E M—Feb., 1916. Facts in regard to shipping situation of the day.

Military Engineering

National Defense—For Engineer and Contractor (68568). P. S. Bond. Ills. 5000 w. E R—March 4, 1916. Serial, 1st part. Military engineers' training and duties.

The Mobilization of Material and Industrial Resources (72138 B). A. L. Humphrey. Ills. 52 pp. E S W P, Pro—June, 1916. Requirements of effective mobilization of industrial resources.

National Defense

National Defense and Development (69202 A). 57 pp. S M—April, 1916. Eleven articles, before Am. Assn. for Adv. of Sci, at Columbus.

The Council of National Defense (72843 A). Howard E. Coffin. 4500 w. E M—Sept., 1916. Why this council is needed, its service, and how organized.

The Engineering Profession and National Defense (73876 N). 7 pp. A R E A Bul—Aug., 1916. Circular letter of the U. S. War Department for arousing interest of the profession.

Consult Classification of the Index. See page 7.

Niagara Falls

Niagara Falls

Niagara Falls and American Industries (69665 N). I. R. Edmonds, F. J. Tone, A. H. Hooker and W. S. Landis. 28 pp. A E S—Apr., 1916. Symposium on various phases, economic, chemical, technical, political.

Pacific Coast

Glimpses of New Pacific Industries in the Making (73302 A). Ills. 3000 w. M & C E—Sept. 15, 1916. Serial, 1st part. Impressions from a recent trip.

Patents

An Appeal for Better Patents (71583 A). Otto Abdt. 2000 w. Mch—July, 1916.

Patents and Inventions (73084). Bayard H. Christy. 2500 w. El A—Sept., 1916. Serial, 1st part. Important points in the securing and marketing of patents.

Safety Points for Inventors (73393). Parker Cook. 1800 w. R A G—Sept. 22, 1916. Information concerning priority of patents.

Preparedness

Industrial Preparedness and the Engineer (71340 A). William L. Saunders. 2400 w. E M—July, 1916. Outlines plan for conserving the industrial and mineral wealth of the United States.

Industrial Preparedness (70819 A). 21 pp. A S M E, JI—June, 1916. Discussion on organizing for industrial preparedness given at the New Orleans meeting.

Industrial Preparedness (71998 A). Howard E. Coffin. 9800 w. E C P, Pro—July, 1916. Problems confronting engineers, and the need of organization.

Industrial Inventory by Engineers Will Stabilize Nation's Business in Crisis, Says Howard E. Coffin (72123). Robert K. Tomlin, Jr. 3500 w. E R—July 29, 1916. Explains method of collecting data on 35000 manufacturing plants.

Preparedness; The American Program (72682 A). Dr. William I. Hull, with discussion. 15,000 w. E C P, Pro—Aug., 1916.

Preparing Our Industries for the Coming Test (72844 A). Edward N. Hurley. 3000 w. E M—Sept., 1916. Weaknesses of industrial plants and what the Federal Trade Commission is doing to remedy them.

What is Preparedness? (72845 A). H. L. Gantt. Ills. 2500 w. E M—Sept., 1916. Advocates the abolition of financial and industrial privilege, and inefficiency in high places.

Prepariamoci (72789 A). Roberto De Vito. 4800 w. S I A I An—July 16, 1916. Address before the Italian Parliament

MISCELLANY

Research

outlining the best means of securing economic and financial preparedness for Italy.

Mobilization of Industrial Resources (72225 A). Ills. 3500 w. I A—Aug. 3, 1916. Observations of A. L. Humphrey in the manufacture of war munitions.

The Automobile Engineer and Preparedness (72217 B). Howard E. Coffin. 7000 w. S A E Bul—July, 1916. The importance of organized industry.

Public Service Opportunity and Preparedness (72607 B). J. L. Jacobs, with discussion. 32 pp. W S E JI—June, 1916. Problems of efficient public administration.

Presidential Addresses

Presidential Address to the Institution of Civil Engineers (65784 A). Alexander Ross. 8500 w. Engng—Nov. 5, 1915. Effects of the war; national resources, and their development and use.

Presidential Address to Northeast Coast Institution of Engineers and Shipbuilders (65746 N). Herbert B. Rowell. 6500 w. N-E Coast Inst of Engrs & Shipbldrs—Nov., 1915. Military devices; the industrial situation; education and training.

Annual Address by the President of the American Foundrymen's Association (66717 N). R. A. Bull. 4500 w. A F A—Oct., 1915. Work of year and advances in practice.

Presidential Address to the North-East Coast Institution of Engineers and Shipbuilders (66487 N). Herbert B. Rowell. 6000 w. N E C I E S—Nov., 1915. Aeroplanes, warships, industry, education, etc.

Railways and Ports

The Relation of Railroads to Foreign Trade (68190). Fairfax Harrison. 4500 w. R A G—Feb. 18, 1916. Need of port development.

Research

The Cash Value of Scientific Research (65651 A). T. Brailsford Robertson. 3500 w. Sci Am—Nov., 1915. Outlines wealth produced by science.

Research (65352 A). Dr. W. R. Whitney. 2200 w. Gen Elec Rev—Nov., 1915. Value of knowledge acquired.

Research and Progress in American Manufacture (65795). Dr. Raymond F. Bacon. 4500 w. Sci Am Sup—Nov. 20, 1915. Address at Nat. Ex. of Chem., Ind.

Industrial Research in America (68505 A). Raymond F. Bacon. 3500 w. S M—March, 1916. Review of progress.

The Organization of Scientific Research (68448 A). J. A. Fleming. 15700 w. R S A, Jour—Feb. 11, 1916. Methods, means, and men; with discussion.

Consult Classification of the Index. See page 7.

Russia

A Symposium upon Co-Operation in Industrial Research (69644 N). Addicks, Lidbury, Bancroft, Walker, Lyon, Baekeland, Whitney. 12 pp. A E I S—Apr., 1916. Relations between individuals, corporations, universities and government.

Scientific and Industrial Research (73223 A). Also editorial. 7000 w. Enr—Sept. 1, 1916. Serial, 1st part. Report of the Committee of the Privy Council for Scientific and Industrial Research.

Russia

L'Influence De La Guerre Sur L'Industrie Russe (72782) B). 3200 w. Gn Cv—July 15, 1916. Effect of the war on Russian industries.

Russian Power

La question des combustibles en Russie (65454 B). J. Vichniak. 2200 w. Gen Civ—Oct. 16, 1915. Fuels and water power in Russia.

Science

The Business Side of Science; Its Part in the Coming Economic Crisis (72609 N). T. C. Elder with discussion. 21 pp. N E C I E S Trans—July, 1916.

Selling Methods

Selling Machinery by Motion Pictures (66285 A). John M. Torr. Ills. 3500 w. E M—Jan., 1916. Advantages from use of industrial films.

Siberia

Industrial Opportunities in Siberia (68134). C. W. Purington. Ills. 5000 w. M & S P—Feb. 12, 1916. Abstract of address before Boston City Club.

Southern States

An Opportunity for the South in the Dye Industry (73138 A). P. R. Moses. 1500 w. M Rd—Sept. 14, 1916. Advantages of location due to proximity of raw materials.

The Role of Chemistry in the Industrial Development of the South (73127 A). Charles H. Herty. 3000 w. M Rd—Sept. 14, 1916. Considered from the qualitative, quantitative, and research viewpoints.

The South and the Awakening of Chemical Industry (73139 A). Allerton S.

MISCELLANY

Cushman. 3000 w. M Rd—Sept. 14, 1916. Relation of the South's resources to national preparedness.

Steel Industry

How the War Will Affect Steel (68329 A). H. H. Campbell. 3000 w. E M—March, 1916. Position and future of our competitors.

Technical Compounds

Some Notes on the Writing of Compound Technical Terms (66823). 3000 w. E & C—Dec. 29, 1915. Critical discussion of American practice.

Trade

Credit and the Future of American Foreign Trade (66434 N). V. Gonzales. 9500 w. Natl Assn Mfrs—Dec. 6, 1915. Study of economic problems.

The International Situation and Future Trade Relations (66433 N). John Bassett Moore. 4000 w. Natl Assn Mfrs—Dec. 6, 1915. Discussion of commercial treaties.

Selling Machinery and Steel in Russia (71476 A). Archibald J. Wolfe. 5000 w. I A—June 29, 1916. Practical points.

The Trade War (71731 A). 1200 w. Enr—June 23, 1916. Recommendations of the Economic Conference of the Allies.

Rehabilitation of Europe Offers Opportunity If American Interests Co-operate (73075). Robert K. Tomlin, Jr. 2500 w. E R—Sept. 9, 1916. Interview with W. S. Kies, discusses relation of engineering construction, manufacturing and finance.

Representation in Foreign Electrical Markets (74176). Ills. 1500 w. E I W—Oct. 28, 1916. Developing new methods.

War Effects

The War and American Chemical Industry (10826 N). Raymond F. Bacon. Read before Am. Chem. Soc. 9000 w. J I & E C—June, 1916. Influence on products formerly imported, on industries, &c.

Women Machinists

Women on Munitions Work (68401 A). Ills. 1800 w. Eng—Feb. 11, 1916. Operations within powers.

Women Machinists

MARINE AND NAVAL ENGINEERING

American Navy

American Navy

American Naval Expansion (72695 A). 3000 w. Enr—Aug. 11, 1916. Editorial letter on the present condition and programme for expansion.

Anchors

Steel Anchors for Merchant and Battleships (73853 A). Edwin F. Cone. Ills. 2000 w. I A—Oct. 12, 1916. Stockless type versus old style. Heat treatment and methods of testing.

Anchor Winches

Vereinfachte Berechnung von Ankerlichtmaschinen insbesondere für Ketten-spille von Kriegsfahrzeugen (68863 B). L. Maurer. Ills. 3000 w. Sch—Feb. 23, 1916. Simplified method for calculating anchor-lifting machines, especially chain capstans on warships.

Backing Trials

How Ships Act on Backing Trials (66932). Henry Penton. Diagrams. 1500 w. M Rv—Jan., 1916. Observations on trials under numerous varying conditions.

Barges

Inland Navigation and Barge Construction vs. Floating Bridges (65766 N). J. H. Bernhard. Ills. 4000 w. Soc Nav Archts & Marine Engrs—Nov., 1915. Details of a modern barge for river navigation.

Oil-Engined Quadruple-Screw Barge on the Mississippi River, U. S. A. (72010 A). Ills. 1500 w. Eng—July 7, 1916. Features of design.

Battle Cruisers

A New Type of Battle Cruiser (69580 A). Ills. 3000 w. M E & N A—April, 1916. From paper by E. Ferretti before Int. Eng. Cong. Suggestions for proposed ship.

Battleship Castings

See Castings under MECHANICAL ENGINEERING, *Machine Works and Foundries*.

Battleships

Modern Battleship Engineering (66012 A). R. H. Danforth. 5000 w. Cleveland Engng Soc, Jour—Nov., 1915. Advances made in efficiency in the navy. Short discussion.

U. S. S. Nevada (68955 N). Ormond L. Cox. Ills. 35 pp. A S N E, JI—Feb., 1916. Description and trials.

Boilers

The Cost of Building a Battleship in a Navy Yard (69455 B). Albert Gleaves. 2500 w. U S N I, Pro—March-April, 1916. Methods of cost accounting; why it costs more to build in navy yards.

Putting the Pennsylvania Through Her Paces (69186 A). Ills. 2000 w. M Rv—April, 1916. Trials.

The German Battleship Grosser Kurfurst (70753 A). Plate. 2000 w. Enr—May 12, 1916. Particulars of this battleship of the "König" class.

U. S. S. Oklahoma (71040 N). Henderson B. Gregory. Ills. 6500 w. A S N E, JI—May, 1916. Description.

La bataille navale du Jutland (72100). 5500 w. Gn Cv—June 24, 1916. Developments of English and German navies as shown by the Jutland Naval Battle.

Large vs. a Greater Number of Smaller Battleships (72599 B). Thomas Lee Johnson. 27 pp. U S N I, Pro—July-Aug., 1916. Prize essay. Arguments decidedly favoring the large battleship.

Battleships (73982 B). Ralph Earle. 30 pp. U S N I—Sept.-Oct., 1916. Lip-pincott prize essay, presenting the case of the small battleship.

Bearings

Automatically Packed Stern Bearings (68850 B). W. G. Leman and Chas. G. Bochman. Ills. 7 pp. P M—Mar.-Apr., 1916. On dredges.

Bilge-Keels

The Effect of Bilge-Keels (71180 A). T. B. Abell. Read before Inst. of Naval Archts. 3000 w. Eng—June 9, 1916. Experiments to determine the resistance of bilge-keels to rolling.

Blowers

Blower Performance, as Affected by Size and Speed of Blower and Density of Air Moved (68962 N). William L. De Baufre. Ills. 5000 w. A S N E, JI—Feb., 1916. Reducing data from tests to standard conditions.

Boilers

Caldaie a intensa produzione di vapore (67062 C + D). Leonardo Fea. Ills. 19 pp. R M—Dec., 1915. Steam production by intensified means, devices including surface combustion.

Consult Classification of the Index. See page 7.

British Engines

The Preservation of Marine Boilers (66993 A). Thomas J. Rogers. 4000 w. I Mr E—Jan., 1916. Suggestions for care.

Boiler Explosion on the S. S. "Bernicia" (67235 A). Also editorial. Ills. 3500 w. Mch E—Dec. 24, 1915. Board of Trade report.

See Marine Boilers, under **MECHANICAL ENGINEERING, Steam Engineering.**

British Engines

The Battle of Jutland (72622 A). Archibald Hurd. 3000 w. C E M—Aug., 1916. As a test of British engines and engineers.

Bulkheads

Schottkurven (66245 B). W. Abel. Ills. 2200 w. Sch—Nov. 24, 1915. Serial, 1st part. Design and calculation of bulkheads.

Sub-Division of Merchant Vessels: Reports of the Bulkhead Committee, 1912-15 (70080 A). Sir Archibald Denny. Read before Inst. of Nav. Archts. 2000 w. Eng—April 21, 1916. General remarks on report.

Some Effects of the Bulkhead Committee's Reports in Practice (70444 A). A. T. Wall. Read at Inst. of Nav. Archts. Ills. 4000 w. Eng—April 28, 1916. Serial, 1st part. How recommendations will affect design, construction, cost, and other factors.

Strength of Water-Tight Bulkheads (70081 A). J. Foster King. Read at Inst. of Nav. Archts. Ills. 5000 w. Eng—April 21, 1916. Results of tests.

Bunkers

The Mechanical Trimming of Coal in Ships' Bunkers (69814 N). Cecil Walter Ward. Ills. 1200 w. I C E, No. 4130—1915. Coal-bunkering machine.

Cannon

Sur l'erosion des canons d'acier par les gaz de la poudre (70190 C+D). D. Tchernoff. Ills. 9 pp. R Met—Oct., 1916. Discussion of erosion of steel cannons by powder gas. Old paper translated from Russian.

Car Ferries

Canadian Railway Ferry-Steamer "Scotia II" (65667 A). Ills. & Plate. 1000 w. Engng—Oct. 29, 1915. Serial, 1st part. Detailed description of vessel for service across the Strait of Canso.

Cargo Handling

The Status of Cargo Handling in American Marine Terminals (72242 A). James A. Jackson and Robert H. Rogers. 2200 w. I Mr E—Aug., 1916. Digest of two papers read at San Francisco, Sept., 1915. Reviews methods and costs, and discusses mechanical handling.

Channel Ferry

The Channel Ferry (72727 A). Ills. 2500 w. E Rv—Aug. 15, 1916. General features.

Coast Defense

Project for Coast Defenses (73877 B). Stanley D. Embick. 15 pp. U S Art, JI—Sept.-Oct., 1916. Functions and character of sea-coast defenses.

Coal Docks

European and American Tidewater Coal Docks (72277). J. F. Springer. Ills. 3000 w. R A G—Aug. 4, 1916. Comparison of terminals.

Coaling Stations

Notes on Maritime Coaling Stations (70750 A). F. J. Warden-Stevens. 1200 w. C G—May 12, 1916. Requirements.

Colliers

Coastwise Collier Jonancy (66987 A). Ills. 500 w. I Mr E—Jan., 1916. Tenth of fleet of 17.

The Panama Colliers Ulysses and Achilles (70775 A). Ills. 1200 w. M Rev—June, 1916. Twin screw vessels.

Collisions

Notes from a Collision Investigation (70082 A). John Reid. Read at Inst. of Nav. Archts. Ills. 3500 w. Eng—April 21, 1916. Empress of Ireland and Storstad, in St. Lawrence River.

How to Avoid Collisions at Night (71480 A). George S. Laing. Diagrams. 1200 w. M Rv—July, 1916. Suggestions.

Corrosion

Voltaic Corrosion and Prevention (70032 A). Thomas J. Rogers. 1800 w. I Mr E—May, 1916. Ship's fittings.

Cranes

Shipyards Cranes of the Rotterdam Dockyard Company (70530 A). M. G. De Gelder. Read before the Inst. of Nav. Archts. Ills. 4500 w. Eng—May 5, 1916. Description and particulars.

5-Ton Electric Cranes for Shipyards (72293 A). Plates. 600 w. Eng—July 21, 1916. Description of cranes at Genoa.

See Shipbuilding Cranes under **MECHANICAL ENGINEERING, Transporting and Conveying.**

Cruisers

Light Cruisers in the War (73449 A). 3000 w. Enr—Sept. 8, 1916. Concerning their standing and losses by the British and Germans.

Het Kruiserhek (73502 B). Ills. 1000 w. Ing—Aug. 19, 1916. Cruiser type stern on merchant steamers.

Dereelicts

Dereelict Destruction (68877 N). C. E. Johnston. Ills. 13 pp. U S Coast Guard

Consult Classification of the Index. See page 7.

Design

Bull No. 4—1916. Methods employed for locating.

Design

Ermittlung der Spantenskala auf geometrischem Wege (66201 B). W. Engelhardt. Ills. 1500 w. Sch—Nov. 10, 1915. Geometrical processes for the design of a ship's framework; with tables and plates.

The Time-Element and Related Matters in Some Ship Calculation (66695 N). J. J. Welch. Curves. 4000 w. N E I E S—Dec. 17, 1915. In certain problems factors may be introduced which render results unrealizable in practice, as shown by examples.

The Drafting Room (66988 A). H. C. Robinson. 1500 w. I Mr E—Jan., 1916. High-priced drafting often gives low-cost production.

Ship Design (68143 A). Edgar P. Trask. 8000 w. A S M D, JI—Jan., 1916. Dimensions, propulsion, stability, etc.

The Time-Element and Related Matters in Some Ship Calculations (68162 N). J. J. Welch. 4000 w. N E C I E S, Trans—Jan., 1916. Serial, 1st. part.

Destroyers

U. S. S. Cushing (66473 A + D). Ormond L. Cox. Ills. 2500 w. A S N E—Nov., 1915. General description and trials of United States torpedo-boat destroyer.

Description and Trials of U. S. S. Torpedo-Boat Destroyer O'Brien (66475 A + D). W. F. Cochrane. Ills. 3000 w. A S N E—Nov., 1915. Formal and technical presentation of results.

Description and Trials of U. S. Torpedo-Boat Destroyer Winslow (66481 A + D). W. F. Cochrane. 1200 w. A S N E—Nov., 1915.

Torpediniere, Cacciatorpediniere E Derivati (72810 C + D). V. Giacomuzzi. Tables. 10,000 w. R M—June, 1916.

Comprehensive review of torpedo boats and destroyers in the navies of the world.

U. S. S. Tucker (72829 N). Ormond L. Cox. Ills. 15 pp. A S N E, JI—Aug., 1916. Twin-screw vessel fitted with Curtis turbines, and its equipment.

Diesel Engines

Diesel Engine Applied to Marine Purposes (65912). C. Kloos. From a paper read at Int. Engng. Cong. Ills. 4000 w. Power—Nov. 23, 1915. Reviews the performance of Diesel-engined ships, discussing features of design of the engines with special reference to the "Werkspoor."

Marine Diesel Engines (65528 A). Lewis B. Doane. Ills. 2500 w. Am Soc of Marine Draftsmen, Jour—Oct., 1915.

Electricity

Types of engines and problems in selection.

The Werkspoor Marine Diesel Engine (66990 A). J. Rendell Wilson. Ills. 2200 w. I Mr E—Jan., 1916. Type installed in twenty-two sea-going commercial ships.

The 4600-I. H. P. Marine Diesel Engines of the M. V. "Ceara" (68914 A). Plates. 4000 w. Eng—Feb. 25, 1916. Engines for Brazilian submarine depot-ship.

Diesel Ships

Some Successes and Failures of Diesel Ships (71415). S. O. Lisle. 2500 w. Pwr—June 27, 1916. Arguments for 4-stroke-cycle in preference to 2-stroke-cycle type.

Diving Apparatus

Diving and Diving Apparatus (67330 A). Ills. 1600 w. M E & N A—Jan., 1916. Apparatus and work of divers.

Dredges

Dredge With Geared Turbine-Driven Pump (70031 A). Ills. 500 w. I Mr E—May, 1916. First in America. At Portland, Ore.

Dredging

See CIVIL ENGINEERING, *Waterways and Harbors*.

Docks

The Repairs to the Gates at the 70-Foot Entrance to the Tyne Docks (65671 A). Ills. 1000 w. Engr, Lond—Oct. 29, 1915. Novel methods.

Dry Docks

Pearl Harbor Dry Dock (66024 D). Ills. 4500 w. Am Soc Civ Engrs, Pro—Nov., 1915. Continued discussion of H. R. Stanford's paper.

Pearl Harbor Dry Dock (66722 D). 1200 w. A S C E—Dec., 1915. Continued discussion of H. R. Stanford's paper.

G. T. P. Dry Dock at Prince Rupert, B. C. (67277). Ills. 1800 w. Cn E—Jan. 13, 1916. Terminal for Pacific Coast shipping.

Pearl Harbor Dry Dock (67599 D). 2500 w. A S C E, Pro—Jan., 1916. Continued discussion of H. R. Stanford's paper.

Economics

The Economics of a Steamship Line (72923 A). E. N. Percy. 1400 w. I Mr E—Sept., 1916. Considers investment, depreciation, hazard, earning capacity.

Electrical Equipment

Marine Electrical Installations (68141 A). L. A. Naudain. 3000 w. A S M D, JI—Jan., 1916. Early and modern.

Electricity

What Preparedness Means in the Industry (70216). Frederic Nicholas. Ills. 2000 w. El W—May 6, 1916. Interview with Frank J. Sprague.

Consult Classification of the Index. See page 7.

Electric Propulsion**Electric Propulsion**

Some Comparisons Relating to Electric Propulsion of a Battleship (65598 N). W. L. R. Emmet. Ills. 1000 w. Soc Nav Archts & Marine Engrs—Nov., 1915. Machinery of the California.

Electric Steering

La Commande Électrique Des Gouvernails (72771 B). Ills. 4400 w. Gn Cv—July 29, 1916. Electric steering apparatus in various navies.

Engine Control

Controlling Marine Engines from the Bridge (69599 A). Ills. 500 w. Eng—March 31, 1916. Apparatus invented by K. Ito.

Engines

Craig Marine Diesel (73459). Ills. 1200 w. Pwr—Sept. 26, 1916. Four-stroke-cycle, high speed engine designed to minimize heat troubles.

The MacLaren Marine Paraffin Engine (73013 A). Ills. 500 w. Eng—Aug. 18, 1916. Brief detailed description.

European Transportation

See Europe under RAILWAY ENGINEERING, *Traffic*.

Evaporators

Salt-Water Evaporators (66480 A + D). William L. De Baufre. Curves. 3000 w. A S N E—Nov., 1915. Calculation of blow-down loss, heat balance, etc.

Ferry Boat

A Double-Ended Motor Ferry Boat (66042 A). Charles J. Belden. Ills. 1000 w. M Rv—Dec., 1915. Steel vessel with gasoline engine.

Motor Driven Ferry for Seattle (70644 A). Ills. 800 w. M Rv—June, 1916. For bay service. Diesel engine.

Fire Float

Motor Fire Float Delta II (65368 A). Ills. 1000 w. Int Marine Engng—Nov., 1915. Shallow draft vessel driven by kerosene motor.

Fleet Maintenance

The Maintenance of the Fleet (65602 N). A. P. Niblack. Map. 3000 w. Soc Nav Archts & Marine Engrs—Nov., 1915. Preparation for defense.

Foreign Trade

How to Put Our Flag on the Ocean (71481 A). 5000 w. M Rv—July, 1916. Suggestions from report of National Foreign Trade Council.

Freeboard

Freeboard; its Preliminary Determination (69259 A). H. A. Everett. 4000 w. I Mr E—April, 1916. Data required.

German Navy

The Torpedo and Submarine Branches of the German Navy (73983 B). Reg-

Lighterage

inald R. Belknap. 22 pp. U S N I—Sept.-Oct., 1916. Study of the organization and administration.

Gunboats

Description and Trials of U. S. S. Sacramento (Gunboat No. 19) (66479 A + D). W. F. Sicard. Ills. 6500 w. A S N E—Nov., 1915.

Gunboats (71078 B). John Stapler. Ills. 3000 w. U S N I, Pro—May-June, 1916. Improvements needed.

Gyroscope Compass

The Theory and Operation of the "Gyroscope" as Applied on Board Ship (70451 A). Harry Adams. 2500 w. A S M D, JI—April, 1916. Practical explanation of compass.

Gyroscopes

Some Notes on Torpedo Gyroscopes and Their Adjustment in Service (68094 B). W. P. Williamson. 3000 w. U S N I, Pro—Jan.-Feb., 1916. Balancing.

The Electrically Driven Gyroscope and Its Uses (71999 A). Elmer A. Sperry. Ills. 4000 w. E C P, Pro—July, 1916. Its use as a stabilizer.

Gyro-Stabilizer

Recent Progress with the Active Type of Gyro-Stabilizer for Ships (65765 N). Elmer A. Sperry. 3000 w. Soc Nav Archts & Marine Engrs—Nov., 1915. Equipment placed on the yacht Widgeon, owned by H. M. Hanna, Jr.

Harbor Defense

The Principles Involved in the Mine Defense of Harbors (71038 B). 6500 w. U S A, JI—May-June, 1916.

Hog and Sag

Data on Hog and Sag of Merchant Vessels (65600 N). T. M. Cornbrooks. Curves. 1000 w. Soc Nav Archts & Marine Engrs—Nov., 1915. Panama colliers Nos. 1 and 2, Ulysses and Achilles.

Inclining Experiments

Inclining Experiments—Practical Hints (70028 A). L. A. Baier. 2500 w. I Mr E—May, 1916. Methods of carrying out.

Interior Decoration

Interior Decoration of Vessels (65599 N). Harry B. Etter. Ills. 5000 w. Soc Nav Archts & Marine Engrs—Nov., 1915. Criticism and suggestions.

Launching

Pressure on a Vessel's Bottom During Launching (69257 A). G. H. Barber. Ills. 1000 w. I Mr E—April, 1916. Method of determining.

Lighterage

"Lighterage" (71030 A). Henry L. Joyce, with discussion. 12000 w. N Y R C, Pro—May 19, 1916. Its development in N. Y. harbor.

Consult Classification of the Index. See page 7.

Lighthouses**Lighthouses**

Lighthouses and Light Vessels of the United States (68684 B). George R. Putnam. Ills. 4000 w. E C P, Pro—Jan., 1916. Work of service.

Power Formulas for Lighthouse-Lights (69797 N). Alan Brebner. (Abstract.) 1000 w. I C E, No. 4124—1915. Sequel to previous papers.

See same heading under CIVIL ENGINEERING, *Construction*.

Lighthouse Tender

New U. S. Ship for Pacific Coast (65359 A). Ills. 1200 w. Marine Rev—Nov., 1915. Details of lighthouse tender, Fern.

Lighting

Under ELECTRICAL ENGINEERING, *Illumination*.

Lloyds

A History of Lloyds (70448 A). J. H. Marsden. 3500 w. A S M D, JI—April, 1916. Development of Royal Exchange, and of Lloyds Register of Shipping.

Load Lines

The Load-Lines of Merchant Ships: Work of the Load-Line Committee (1915) (69882 A). Sir Philip Watts. Read before Inst. of Nav. Archts. 5500 w. Eng—April 14, 1916. History of question.

Some Questions in Connection with the Work of the Load-Line Committee (69883 A). W. S. Abell. Read before Inst. of Nav. Archts. 7000 w. Eng—April 14, 1916.

The Load-Line Committee Report (69823 A). 4500 w. Eng—March 17, 1916. Editorial review.

Lubrication

Practical Lubrication (66472 A + D). G. S. Bryan. 4000 w. A S N E—Nov., 1915. Information useful to engineers.

Marine Propulsion

Application of Electricity to Marine Transportation (73600 N). William T. Donnelly. Ills. 35 pp. B'klyn Engrs' Club, Pro—1916. Scientific study, with view of broadly increasing the application.

Merchant Marine

A New and Constructive Policy for Upbuilding the American Merchant Marine (68612 A). Bernard N. Baker. 4000 w. I Mr E—March, 1916. Shipping board; expansion of commerce; auxiliaries.

An Analysis of the Shipping Bill (68611 A). 2500 w. I Mr E—March, 1916. Features of measure.

The Shipbuilding and Shipping Situation (68610 A). 11000 w. I Mr E—March, 1916. Views of leaders.

Naval Service

The Merchant Marine (70450 A). William G. Randle. 3500 w. A S M D, JI—April, 1916. American merchant marine; history and needs.

The American Merchant Marine (71598 A). Frank J. Nolan. 3000 w. I Mr E—July, 1916. The need and value in international trade.

Mine-Laying Submarine

Un Sous-Marin Allemand Poseur De Mines (73536 B). Du Verseau. Ills. 1400 w. La Nt—Sept. 9, 1916. Description of German submarine mine layer captured by the British.

Mine Sweeping

The Development of the Science of Mine-Sweeping (66701 N). Translated from *Nauticus* for 1914. Ills. 7000 w. R U S I—Nov., 1915.

Model Experiments

Notes on Model Experiments (66361 N). G. S. Baker. Ills. 20 pp. N E C I E S—Nov. 26, 1915. Work in William Froude National Tank.

Motor Ships

The Western Australian Government Motor-Ship "Kangaroo" (65781 A). Ills. 1200 w. Engng—Nov. 5, 1915. Ship driven by Diesel engines, for service between Australia and England.

Het motorschip "Mijer" der Koninklijke Paketvaart-Maatschappij (65437 B). W. J. Muller. Ills. 7000 w. Ingenieur—Oct. 23, 1915. Driving mechanism of Diesel-engined Dutch ship.

Twin-Screw Motor Tank Vessel Hera (66080 A). Ills. 800 w. Enr—Nov. 19, 1915. Details of vessel and machinery.

De uitreis naar Nederlandsch-Indië van het motorschip "Mijer" der Koninklijke Paketvaart-Maatschappij (68833 B). W. J. Muller. Ills. 2500 w. Ing—Feb. 19, 1916. Performance of motor ship Mijer on outward voyage to Dutch East Indies.

Auxiliary Motor Ship City of Portland (70777 A). Kenneth McAlpin. Ills. 1200 w. M Rev—June, 1916. Vessel for lumber trade.

The Brazilian Submarine Dépôt Motor-Ship "Ceara" (71637 A). Plates. 1200 w. Eng—June 16, 1916. Description.

Gain of Cargo Capacity in Motor Ship of About 3,000 Tons Deadweight Capacity (72924 A). R. W. Crowley. Ills. 1700 w. I Mr E—Sept., 1916. Comparison between a motor vessel and a steamer.

The Twin-Screw Motor-Ship "Peru" (73957 A). Ills. & Plate. 1800 w. Eng—Oct. 6, 1916. Diesel-engined vessel. Details of equipment.

Naval Service

A Personnel Reserve for the Naval Service (73987 B). C. C. Gill. 17 pp.

Consult Classification of the Index. See page 7.

Naval Stations

U S N I—Sept.-Oct., 1916. Suggests a tentative framework for a well-rounded reserve.

Naval Stations

The Industrial and Strategic Importance of Our Naval Stations (71043 N). John R. Edwards. 60 pp. A S N E, JI—May, 1916. Need of preparing naval stations for military-industrial work.

Navy Yards

Equipment for Navy Yard Shops (71077 B). J. A. Furer. Ills. 30 pp. U S N I, Pro—May-June, 1916. Outlines methods of determining requirements.

Oil Burning

Oil Burning (66482 A + D). A. M. R. Allen. 4000 w. A S N E—Nov., 1915. Proper operation; training of firemen.

Some Experiments in Natural Draft Oil Burning (72828 N). L. R. Ford. Ills. 12 pp. A S N E, JI—Aug., 1916. Notes on a series of tests, and the successful system on the U. S. S. Fulton.

Oil Engines

Marine Oil Engines for Commercial Work (65370 A). Ills. 1500 w. Int Marine Engng—Nov., 1915. Construction and operation; application to work boats.

See same heading, under MECHANICAL ENGINEERING, *Combustion Motors*, and Diesel Ships, under MARINE AND NAVAL ENGINEERING.

Periscope

The Parodi Periscope (69881 A). From *Rivista Marittima*. Ills. 400 w. Eng—April 14, 1916. Descriptive.

Power Boats

Power Boats for National Defense (65358 A). Ills. 2000 w. Marine Rev—Nov., 1915. Proposed plan.

Preparedness

Naval Preparedness and the Civilian Engineer (69767 B). Frank J. Sprague. 44 pp. W S E, JI—Feb., 1916.

Projectiles

Piastre Di Corazza E Proietti Perforanti (72811 C + D). G. Pallini. Ills. 10,000 w. R M—June, 1916. Description and tabulation of results of tests with armor-piercing projectiles in Italian navy.

Propellers

The Mystery of the Screw Propeller (66470 A + D). C. W. Dyson. Charts. 50 pp. A S N E—Nov., 1915. Partial solution.

The Screw Propeller (66299 A). Sir Archibald Denny. Read before the Inst. of Marine Engrs. 4500 w. Mch E—Dec. 17, 1915. Experimental study.

On the Co-ordination of Propeller Results (71728 A). J. Denholm Young. Read before Inst. of Nav. Archts. 3000 w.

Propulsion

Eng—June 23, 1916. Rapid and convenient system.

Screw Propellers—Their Design and Analysis (68140 A). J. S. Malseed. Also remarks by C. W. Dyson. Curves. 5000 w. A S M D, JI—Jan., 1916. Dyson method.

Propeller Design for Turbine-Driven Ships (67837 A). N. A. Graveson. Ills. 2500 w. I Mr E—Feb., 1916. Determining dimensions.

A Criterion of Propeller Surface (69255 A). Peter Doig. 1500 w. I Mr E—April, 1916. Dimensions for certain conditions.

Geometry of Wide-Bladed Screw Propeller (70030 A). Norman A. Graveson. 1500 w. I Mr E—May, 1916. Correct method of drawing.

Die-Cast Propellers (72568). Frederick W. Bull. Ills. 2500 w. B W—Aug., 1916. Process described.

Some Notes on Screw Propeller Action (72728 A). W. Gatewood. 4000 w. A S M D, JI—July, 1916. Theories of propeller action considered.

Propeller Shafts

Propeller Shafts: How to Preserve and How to Protect Them (69714 A). A. J. Lebeda. Read before Inst. of Marine Engrs. Ills. 1200 w. Mch E—April 7, 1916. Appliances for retaining oil.

Propulsion

Some Alternative Types of Propelling Machinery for a 19½-Knot Steamer (66486 N). James Dornan. Tables and Drawings. 20 pp. I E S S—Nov., 1915. Weights, coal consumption, and space necessary.

Some Alternative Types of Propelling Machinery for a 19½-Knot Steamer (66859 N). 7500 w. I E S S—Dec., 1915. Discussion of James Dornan's paper.

Description of Main Propelling Machinery for the U. S. S. Maumee (66471 A + D). C. W. Nimitz. Ills. 28 pp. A S N E—Nov., 1915. Ship for fuel and supplies, propelled by Diesel engines.

The Geared Turbine and the Turbo-Electric Systems of Marine Propulsion (66986 A). John H. Macalpine. Ills. 5000 w. I Mr E—Jan., 1916. Trials of collier Neptune compared with performance of sister ship.

Electric Propulsion on a Merchant Vessel (66989 A). Ills. 1200 w. I Mr E—Jan., 1916. Ljungstrom turbo-electric machinery installed on Swedish coastwise merchant steamer.

Some Alternative Types of Propelling Machinery for a 19½-Knot Steamer

Consult Classification of the Index. See page 7.

Pumps

(68160 N). 8500 w. I E S S, Trans—Jan., 1916. Discussion of Dornan's paper.

Trails of Geared Turbine Propelling Machinery on Freight Steamer Pacific (68616 A). 1000 w. I Mr E—March, 1916. Curtis 5-stage turbine.

The Geared-Turbine Propelling Machinery of the S. S. "Northumberland" (69322 A). Ills. 250 w. Eng—March 17, 1916. Serial, 1st part.

Turbo Electric Propulsion for Low Powered Ships (70557 A). J. Dornan. Ills. 2500 w. C E M—May, 1916. Possibilities of Ljungström turbo-electric system.

The Determination of the Principal Dimensions of Marine Reciprocating Propelling Machinery (70025 A). T. S. Cockrill. 1500 w. Enr—April 14, 1916. Rules for design and estimating.

Economic Marine Propulsion (71597 A). Thomas J. Rogers. 800 w. I Mr E—July, 1916. Relations between speed and fuel consumed.

Efficiency of Propulsive Machinery and Late Developments in Naval Engineering (73747 A). H. C. Dinger. 7500 w. A S M E, JI—Oct., 1916. Advance in economy in turbine propulsion and recent improvements in auxiliary machinery.

Pumps

Notes on Pumps (66483 A + D). S. M. Robinson. 7500 w. A S N E—Nov., 1915. Information obtained from officers.

Refrigerator Ship

Conversion of the Army Transport McClellan into a Refrigerator Ship (69258 A). F. J. French. Ills. 1500 w. I Mr E—April, 1916. Rapid and successful work.

Repairing

How Lake Freighters Are Laid Up (67624 A). F. A. Churchill, Jr. Ills. 3000 w. M Rv—Feb., 1916. Refitting and repairing work carried on during winter.

Resistance

The Determination of the Resistance of Ships. Present Day Status of the Art (65596 N). Ernest H. Rigg. 3500 w. Also bibliography. Soc Nav Archts & Marine Engrs—Nov., 1915. Review of present knowledge on the subject of powering ships.

Variation of Frictional Resistance of Ships with Conditions of Wetted Surface (65595 N). William McEntee. Ills. 1500 w. Soc Nav Archts & Marine Engrs—Nov., 1915. Tests at U. S. Experimental Model Basin.

River Steamers

Western River Steamers and Barges (65367 A). Ills. E. A. Burnside. 3000

Shafting

w. Int Marine Engng—Nov., 1915. Construction of towboats and barges.

Riveting

Scientific Studies Applied to Riveting (72926 A). William M. Kennedy. 5000 w. I Mr E—Sept., 1916. Analysis of cost of riveting and methods of reducing costs.

Russia

The First Russian Fleet (69050 N). R. C. Anderson. 2700 w. R U S I, JI—Feb., 1916. Foundation by Peter the Great.

Sail Experiments

Aerodynamical Experiments Upon a Yacht's Mainsail (65594 N). H. A. Everett. Ills. 3500 w. Soc Nav Archts and Marine Engrs—Nov., 1915. At Massachusetts Institute of Technology. Experimental work and results.

Salvage

The Refloating of the Hendonhall (66992 A). Robert G. Skerrett. Ills. 1000 w. I Mr E—Jan., 1916. Salving with compressed air.

The Salvage of the U. S. S. Princeton at Pago Pago, Samoa (68964 N). H. H. Little. Ills. 12 pp. A S N E, JI—Feb., 1916. Sinking and recovery.

Recovering Stranded Ships After Galveston storm (69517). Ellis D. Thompson. Ills. 900 w. E N—April 13, 1916. Large dredging job.

Salvage of the Japanese Armored Cruiser "Asama" (72576 A). Ills. 1200 w. Eng—Aug. 4, 1916. From paper by M. Iwano, T. Urata, and Y. Hashiguchi, read before Japanese Soc. of Nav. Archts. Descriptive.

Salving of the Steamship "Leander" (72689 A). Ills. 1000 w. Eng—Aug. 11, 1916. Novel method of dredging a salving channel.

Salvaging

Raising the Submarine F-4 (65540). Ills. 4000 w. Eng News—Nov. 4, 1915. Account of work in Honolulu harbor.

The Refloating of the R. N. San Giorgio (Nov. 21-Dec. 10, 1913) (66451 B). Ills. 11000 w. U S N I—Nov.-Dec., 1915. Extracts from report of Rear-Admiral Umberto Cagni.

Salvage Operations on Submarine F-4 (66449 B). J. A. Furer. Ills. 10000 w. U S N I—Nov.-Dec., 1915. Detailed account.

Searchlights

Discussion on "Searchlights" (McDowell), New York, February 18, 1915 (66666 D). 4000 w. A I E E—Dec., 1915.

Shafting

Weight Curves for Marine Engine Shafting (71175 A). 1000 w. Mch W—June 9, 1916. Labor-saving methods.

Consult Classification of the Index. See page 7.

Shafts**Shafts**

How to Preserve and Protect Propeller Shafts (67329 A). A. J. Lebeda. Read before Inst. of Marine Engrs. Ills. 1200 w. M E & N A—Jan., 1916. Preventing corrosion and reducing friction. Appliances in use.

Aligning the Propelling Shafting of Ships (66896 A). N. I. Mosher. Ills. 1500 w. Mch—Jan., 1916. Establishing centers.

Ship Auxiliaries

Ship Auxiliaries (65529 A). G. E. Smith. 2500 w. Am Soc of Marine Draftsmen, Jour—Oct., 1915. Vessel handling machinery.

Ship Brake

Results of Model Tank Experiments to Determine the Action of a Ship Brake (65597 N). William Strother Smith. Ills. 1200 w. Soc Nav Archts & Marine Engrs—Nov., 1915. Data for use in determining whether or not it was feasible to install a brake to assist in stopping a steamer when in danger.

Shipbuilding

Les principes généraux de la construction du navire (71323 B). M. Zack. Ills. 4000 w. R G S—May 15, 1916. General principles in ship building. Hull resistance and arrangement of framework.

Increases Ship Building Facilities (72056). F. A. Churchill, Jr. Ills. 1500 w. I T R—July 27, 1916. Extensive additions at a Cleveland plant.

The Yield of Riveted Connections in Shipbuilding (72160 A). Arthur R. Liddell. 2000 w. Enr—July 14, 1916. Efficiency of different connections.

Wooden Shipbuilding on the Pacific Coast (72925 A). Ills. 2500 w. I Mr E—Sept., 1916. Growing popularity of auxiliary sailing vessels.

Ship Deflection

Deflection of Ships Due to Temperature Influence (72541 A). Dr. K. Suychiro and T. Inokuty. Ills. 1200 w. Eng—July 28, 1916. Mathematical determination.

Ship Design

Skin Friction Resistance of Ships (71638 A). G. S. Baker. Read before Inst. of Nav. Archts. 4000 w. Eng—June 16, 1916. Useful experimental data and computations.

Ship Performance

Stopping, Backing and Turning Ships (68957 N). S. M. Robinson. Curves. 5000 w. A S N E, JI—Feb., 1916. Data obtained in connection with electric drive.

Ship Trim

The Trim of Ships (74224). 2000 w. T E S—Sept. 29, 1916. Effects on design and use discussed.

Stabilizing Ships**Shipyards**

Newport News Shipyard and Repair Plant (68614 A). Ills. 1000 w. I Mr E—March, 1916. Descriptive.

The Fore River Shipyard (68613 A). Ills. 2000 w. I Mr E—March, 1916. Improvements at Quincy, Mass.

Cleveland Ship Yard Is Improved (69187 A). F. A. Churchill, Jr. Ills. 2000 w. M Rv—April, 1916. Important extensions.

The New Skinner & Eddy Shipyard (72245 A). Gilbert C. Dohm. Ills. 1200 w. I Mr E—Aug., 1916. Steel shipbuilding facilities on Puget Sound.

U. S. Ship Yards Repair First Rank (72878 A). 5000 w. M Rev—Sept., 1916. Review showing gain in ocean tonnage.

Ships' Tools

Power-Driven Tools for Ships (68096 A). J. H. Thomson. Read before Inst. of Marine Engrs. Ills. 3000 w. M E & N A—Feb., 1916. Serial, 1st part. Number, size, arrangement, and general equipment.

Skin Friction

The Laws of Skin Friction (71156 A). Charles H. Lees. Read before Inst. of Naval Archts. 4500 w. Eng—June 2, 1916. Laws of skin friction of a fluid in stream line and in turbulent motion along a solid of great length.

Stability

A Method of Estimating the Stability Required by a Ship (65924 A). Arthur R. Liddell. 1500 w. Engr, Lond—Nov. 12, 1915. Suggestions and explanation.

Ship Stability—The Need for Investigation (67835 A). A. T. Wall. 2000 w. I Mr E—Feb., 1916. Safe loading; responsibility, and other important questions to be solved.

The Standardization of Stability Curves (67990 N). Wilfrid Ayre. Curves. 2500 w. N E C I E S—Jan. 28, 1916. Method.

The Standardization of Stability Curves (68659 N). Wilfrid Ayre. Curves. 2500 w. N E C I E S, Trans—Feb., 1916. Method for designing.

The Standardization of Stability Curves (69734 N). 5000 w. N E C I E S, Trans—March, 1916. Discussion of Ayre's paper.

Stabilizers

Steel Castings as Ship Stabilizers (71777 A). Ills. 800 w. I A—July 13, 1916. Largest gyroscopic rotors made, and their applications for marine purposes. See *Gyroscopes*.

Stabilizing Ships

The Sperry "Active" Gyroscope for Stabilizing Ships (73109 A). Also edi-

Steam Plants

torial. Ills. 4000 w. Enr—Aug. 25, 1916. Gyroscopic plant for ships of the U. S. Navy.

Steam Plants

Analyzing a Marine Steam Plant (69261 A). E. N. Percy. 3500 w. I Mr E—April, 1916. Serial, 1st part. Governing features of design; steps of analysis involved.

Steamships

Clyde Line Steamers Built on the Lakes (71599 A). Ills. 1200 w. I Mr E—July, 1916. Welland Canal size ocean-going freighters.

Geared Turbine Tank Steamer (72248 A). Ills. 3500 w. I Mr E—Aug., 1916. Describes ships built at the Fore River yard.

Doppelschraubendampfer "Jean Pieterszoon Coen" (66202 B). Ills. 500 w. Sch—Nov. 10, 1915. Passenger steamer recently launched for the Dutch-Java trade.

Stoomschip "Turbinia" (69603 B). R. C. Weidemaar. Ills. 2000 w. Ing—March 4, 1916. Turbine-driven vessel.

New Dutch Passenger and Mail Steamship (69256 A). Frederick C. Coleman. Ills. 500 w. I Mr E—April, 1916.

French Transatlantic Quadruple-Screw Steamship "Lafayette" (70853 A). Plates. 1000 w. Eng—May 19, 1916.

Steamship Service

Corresponding Conditions of Steamship Service (70027 A). Arthur R. Liddell. 1200 w. I Mr E—May, 1916. Tables of approximate values. Suitability of sizes and speeds for particular service.

Steel Boats

A New Method of Bending Plates for Eliminating Riveted Joints in Light Steel-Boat Construction (66860 N). James Anderson. Ills. 2000 w. I E S S—Dec., 1915.

Steering

Efficient Steering (69260 A). Charles R. Pratt. Ills. 1500 w. I Mr E—April, 1916. Details of improved gear.

Stresses

Notes on the Stresses in Ships (72729 A). Gordon G. Holbrook. 2000 w. A S M D, JI—July, 1916. Outlines some of the stresses to which large ships are subjected.

Submarine Engines

Submarine Engines of the German Navy (71047 N). C. W. Minitz. Ills. 3500 w. A S N E, JI—May, 1916. Types.

Submarine Mother

Need of an Efficient Mother Ship for the Submarines of the United States Navy (70029 A). R. G. Skerrett. Ills. 2800 w. I Mr E—May, 1916. New type designed by Major Laurenti, Italy.

Survey Steamer**Submarine Tender**

Description and Trials of U. S. S. Fulton (Submarine Tender No. 1) (66477 A + D). C. N. Hinkamp. Diagrams. 2500 w. A S N E—Nov., 1915.

U. S. S. Bushnell, Submarine Tender, No. 2 (72830 N). G. E. Davis. 22 pp. A S N E, JI—Aug., 1916. Details of vessel and equipment.

Submarines

The Submarine of To-day and To-morrow (65768 N). L. Y. Spear. 8500 w. Soc Nav Archts & Marine Engrs—Nov., 1915. Mechanical development; design problems; types; and present outlook.

Het gebruik en de inrichting van onderzeeische vaartuigen (65975 B). W. F. Pot. Ills. 15000 w. Ingenieur—Nov. 6, 1915. General review of submarine design, machinery and handling.

The Submarine Power Plant (65696 A). Allen Hoar. Ills. 3500 w. Sib Jour of Engng—Nov., 1915. Systems tried and their defects.

Present Condition of the Submarine (66636 A). Max A. Laubeuf. Abstract of paper before the Int. Cong. Diagrams. 3000 w. Eng—Dec. 3, 1915. Types, construction and present tendencies.

Propulsive Machinery for Submarines (68963 N). G. Berling. Ills. 25 pp. A S N E, JI—Feb., 1916. Storage batteries, electric motors, and Diesels used for the purpose.

How the Submarine is Navigated (69978 A). Ills. 1000 w. M Rv—May, 1910. Instruments developed.

First Undersea Trader Reaches U. S. (72190 A). Ills. 600 w. M Rv—Aug., 1916. Details of German submarine.

The Electrical Equipment of a Modern Foreign Submarine Boat (72519 A). Norman H. Wood. Ills. 1500 w. El R—Aug. 4, 1916. Serial. 1st part. Detailed description.

The German Submarines C 5 and Deutschland (72542 A). Ills. 500 w. Enr—July 28, 1916. Brief description and comparisons.

The Log of the C. S. Submarine (73985 B). William E. Beard. 13 pp. U S N I—Sept.-Oct., 1916. Details of boat used in defence of Charleston harbor during the Civil War.

Superheated Steam

Superheated Steam in Marine Practice (65603 N). Henry B. Oatley. Ills. 8800 w. Soc Nav Archts & Marine Engrs—Nov., 1915. The position now occupied.

Survey Steamer

Harbor Survey Boat General C. B. Sears (70776 A). Ills. 800 w. M Rv—

Telegraph System

June, 1916. Government vessel for harbor improvement.

Telegraph System

An Alternating-Current System for Engine Telegraph, Helm-Angle Indicators, Etc. (71044 N). Leonard A. Doggett. Ills. 1500 w. A S N E, JI—May, 1916. Describes the five-wire alternating current telegraph system.

Test Station

Mechanical Test Station for a Navy Yard (68961 N). E. F. Maas. Ills. 3500 w. A S N E, JI—Feb., 1916. At Puget Sound.

Thrust Block

Design of an Ideal Thrust Block (72528 A). C. P. Tanner. Ills. 1800 w. Mch E—July 14 1916. Prize essay. Inst. of Marine Engrs. Types in use and their advantages.

Timber

Das "Arbeiten" des Holzes und seine Bekämpfung (67774 B). Rudolf Sodemmann. Ills. 2500 w. Sch—Jan. 26, 1916. Discussion of uses and treatment of wood in ship construction.

Torpedo-Boats

Spanish Torpedo-Boat Destroyers of the "Bustamante" Class (68400 A). Ills. and plate. 700 w. Eng—Feb. 11, 1916. Serial, 1st part. Details.

U. S. S. Conyngham (71042 N). H. H. Norton. Ills. 2500 w. A S N E, JI—May, 1916. Detailed description and trials.

U. S. S. Jacob Jones (71048 N). W. F. Sicard. Ills. 3000 w. A S N E, JI—May, 1916. Description.

Tugs

The Diesel Motor Tug Chickamauga (65369 A). George E. Nicholson. Ills. 1000 w. Int Marine Engng—Nov., 1915. Designed for towing on Puget Sound.

New Tugs for Central Railroad of N. J. (67834 A). Alton A. Norton. Ills. 1000 w. I Mr E—Feb., 1916.

Turbines

The Application of the Steam Turbine to Marine Propulsion (65662 A). J. F. Metten. Ills. 2500 w. Marine Engr & Nav Archt—Nov., 1915. Serial, 1st part. Outlines various methods of application and the work for which each seems adapted.

The Application of Small Steam Turbines for Auxiliary Purposes on Board Ship (65767 N). W. J. A. London and Frederick D. Herbert. Ills. 8500 w.

Wave Motion

Soc Nav Archts & Marine Engrs—Nov., 1915. Applications and details of design.

Turbine Machinery of the S. S. "Bingera" (66813 A). Ills. 700 w. Eng—Dec. 17, 1915. Replacement by triple-expansion reciprocating engines.

Ueber die Kreiselwirkung bei Schiffsturbinen (68861 B). Alfred Lechner. Ills. 1500 w. Z g T—Feb. 20, 1916. Discussion of gyroscopic effect of rapid rotation in ships' turbines.

The Ljungström Turbine and its Application to Marine Propulsion (70280 N). Roland S. Portham. Ills. 30 pp. I E S S, Trans—April, 1916. Details of design.

Marine Steam Turbine Machinery (70452 A). E. H. B. Anderson. 5000 w. A S M D, JI—April, 1916. Discusses points brought out in recent papers.

The Ljungström System of Electric Drive (72832 N). W. B. Carter. Ills. 20 pp. A S N E, JI—Aug., 1916. Features of this turbine system of electric propulsion.

Westinghouse Geared Turbine Machinery for Single Screw Tank Steamer (72244 A). Ills. 5500 w. I Mr E—Aug., 1916. Cross compound, double reduction type turbine drive.

U. S. Navy

Engineering in the Navy (66051 A). W. L. R. Emmet. 1300 w. G E R—Dec., 1915. Difficulties encountered and improvements needed.

Vibration

Period of Vibration of Steam Vessels (65601 N). William Gatewood. Curves. 4500 w. Soc Nav Archts & Marine Engrs—Nov., 1915. Investigations and methods.

Wave Motion

Il moto ondoso del mare riprodotto artificialmente in una vasca sperimentale (70160 C + D). G. Russo. Ills. 11 pp. R M—Mar., 1916. Device for reproducing in a reservoir the wave motion of the sea.

An Experimental Tank Reproducing Wave Motion (70752 A). G. Russo. Read before Inst. of Nav. Archts. Also —Note on Echelon Waves. George Greenhill. Ills. 4500 w. Eng—May 12, 1916. Wave motion of the sea reproduced in tank.

Wave Proportions and Their Effects (71182 A). Arthur R. Liddell. 1500 w. Enr—June 9, 1916. Theories and rules of practice.

MECHANICAL ENGINEERING

AERONAUTICS	198	MACHINE WORKS AND FOUNDRIES	223
AUTOMOBILES	200	MATERIALS OF CONSTRUCTION..	237
COMBUSTION MOTORS	210	MEASUREMENT	245
HEATING AND COOLING	213	POWER AND TRANSMISSION	251
HYDRAULIC MACHINERY	219	STEAM ENGINEERING	253
MACHINE ELEMENTS AND DESIGN	221	TRANSPORTING AND CONVEYING.	262
MISCELLANY	265		

Accidents

Accidents

Aeroplane Accidents: Causes and Remedies (72600 B). R. C. Saufley. 18 pp. U S N I, Pro—July-Aug. 1916. Due to air conditions, material, or personal error.

Aero-Motor

The Martin Aero-Motor (72999 A). Ills. 1200 w. Aern—Aug. 23, 1916. Detailed description.

Aeronautic Engines

The Development of Engines Suitable for Aeronautic Service (70105). Charles E. Lucke. 2500 w. A A—May 1, 1916. Serial, 1st part. Thorough discussion.

Aeroplane Engines

Twin-Six Engines for Aeroplanes (65648). Frederick Eppelsheimer. Ills. 1700 w. Sci Am—Nov. 13, 1915. Requirements and types.

The New 8-Cylinder 135 H. P. Thomas Aeromotor (65434). Ills. 500 w. Aer Age—Nov. 1, 1915. Detailed specifications.

Should Aero Engines be Air or Water-Cooled? (66677 A). 3500 w. Aer—Dec. 11, 1915. Favoring water-cooled.

The 120-H. P. Beardmore Austro-Daimler Aero Engine (67021). Ills. 400 w. A A—Jan. 10, 1916. Brief description.

The Aeroplane 100 H. P. Motor (68303 A). Ills. 1000 w. Aern—Feb. 2, 1916. Brief description.

The Twelve-Cylinder Rausenberger Aeronautical Motor (68308). Ills. 1000 w. A A—Feb. 21, 1916. Outline of construction and performance.

The Sunbeam-Coatalen 225 H. P. Aero Engine (67780). Ills. 250 w. A A—Feb. 14, 1916. Brief description.

"Una-Flow" Steam Engine (68315 A). William Clinton Brown. Ills. 800 w.

AERONAUTICS

Aeroplanes

Aern—Feb. 9, 1916. Possibilities of adaptation to aeroplane use. Paper presented before the Aeronautical Society of America.

Aeroplane Power Plants (68958 N). Warren G. Child. Ills. 30 pp. A S N E, J1—Feb., 1916. Requirements and models.

Aero Engine Design (69656 A). Ills. 16 pp. Aern—March 29, 1916. General discussion followed by details of many motors.

Van Blerck "Twin Six" Aeronautical Motor, Model F-12 (69619). Ills. 600 w. A A—April 3, 1916. Brief description.

The Wisconsin Aeroplane Motors (70193). Ills. 1500 w. A A—May 22, 1916. General description.

The Martin Aeronautic Motor (70178). Ills. 1000 w. A A—May 15, 1916. Detailed description.

300 Cn. In. Twelve for Aviation (70089). Ills. 2500 w. Aut—May 4, 1916. New Packard motor.

Aeroplanes

Sloane Tractor Biplane Type "H-1" (67004). Ills. 300 w. A A—Jan. 3, 1916. Brief description.

Stable Biplane Arrangements (67523 A). Jerome C. Hunsaker. Diagrams. 2000 w. Eng—Jan 7, 1916. Serial, 1st part. Research at wind tunnel of Mass. Inst. of Technology.

The "Federal" Pusher Biplane (70126). Ills. 500 w. A A—May 8, 1916. Details of construction.

Dynamical Stability of Aeroplanes (71988). Jerome C. Hunsaker. 2500 w. A A—July 24, 1916. Serial, 1st part. Investigations.

Consult Classification of the Index. See page 7.

Aeroplane Wings

Eastern Military Tractor (74184). Ills. 1000 w. A A—Oct. 30, 1916. Dimensions and details.

Aeroplane Wings

Aeroplane Wings (67059). Neil MacCough. Ills. 600 w. A A—Jan. 24, 1916. Serial, 1st part. Design..

Aircraft

Aircraft Inspection and Output (73220 A). F. G. Stone. 1600 w. Eng—Sept. 1, 1916. Suggests the establishment of an aircraft engineering department, directly responsible to the Air Board.

Le Fuselage En Aviation (73529 B). P. Boccaccio. Ills. 1600 w. La Nt—Sept. 2, 1916. Design of aeroplanes for military purposes.

Air Service

The Interim Report of the Air Inquiry Committee (73107 A). 1600 w. Enr—Aug. 25, 1916. Reviews report dealing with the administration of the Royal Flying Corps.

Airships

Froude's Law for the Airship (70858 A). George Greenhill. 1100 w. Enr—May 19, 1916. Possibilities of air service.

Balloons

L'Aéronautique Dans La Grande Guerre (72772 B). Ills. 3000 w. La Nt—July 29, 1916. Development of balloons by various armies in the present war.

Boilers

The Winslow Boiler (68840 A). Robert Cramer. Ills. 600 w. Aern—Feb. 16, 1916. Advantages of type.

Catapults

The Aeroplane Catapult in the United States Navy (69331 A). Ills. 2000 w. Enr—March 17, 1916. On U. S. S. North Carolina.

Clothing and Equipment

Clothing and Equipment for Aviators (65458). Aerncts—Oct. 27, 1915. Serial, 1st part. General article.

Design

A Study Concerning the Best Proportion for a Stream-Line Body (70851 A). F. W. Lanchester. Ills. 1000 w. Eng—May 19, 1916.

Dirigibles

Sull'Impiego Dei Dirigibili (72808 C + D). U. Rossini. 2000 w. R M—May, 1916. Discussion of defects and advantages of dirigibles, with special reference to Zeppelins in the present war.

L'Aéronautique Et La Guerre—Les Dirigeables (73526 B). Ills. 3600 w. La Nt—Aug. 26, 1916. Recent types of dirigibles, both German and French.

AERONAUTICS**Engines**

Engine Power at High Altitudes (65487). Neil MacCough. Ills. 1200 w. Aer Age—Nov. 22, 1915. Effect of rarified air on capacity.

Aviation Engines (70898). J. G. Vincent. Ills. 3000 w. Aut—June 8, 1916. Recent Aeroplane-Engine Developments (71468 N). Neil MacCough. Ills. 20 pp. S A E—June, 1916. Effects of war.

Aviation Engines (71825). J. G. Vincent. 3000 w. A A—July 17, 1916. Points to be considered in selecting a motor for this exacting service. Recent improvements.

On the Elementary Design of Aeroplane Engines (71718 A). John Wallace. 2000 w. Aern—June 28, 1916. Serial, 1st part. Principles underlying the design and construction.

Wisconsin Adds Aviation Engine (71609). Ills. 1500 w. Aut—July 6, 1916. Features like racing engine.

Martin Aviation Engine Unique Design (72305). Ills. 1200 w. Aut—Aug. 3, 1916. Details of design.

New Hall-Scott Engine—Type A-7 (72468). Ills. 1800 w. A A—Aug. 14, 1916. 4-cylinder engine rated 90-100 h. p.

Effect of the War on Aeroplane Engine Design (73226). Granville Pollock. Ills. 2500 w. Aut—Sept. 14, 1916. Leading types.

Engines of the Air (73354 B). J. G. Vincent. 1500 w. S A E, Bul—Aug., 1916. Details of the best construction.

Engine Testing

See same heading under *Combustion Motors*.

Factories

The Layout of an Aircraft Factory (68826 B.) George H. Mansfield. Ills. 1800 w. Aern—Feb. 23, 1916. Recommendations.

Flying

History of the Conquest of the Air. (71719 A). Henry Woodhouse. Ills. 10500 w. Fly—July, 1916.

Flying Boats

The New Thomas Flying Boat (65433). Ills. 500 w. Aer Age—Oct. 25, 1915. Brief description of design.

Following-Plane Machines

Theory and Experiments in Following Plane Machines (67781 N). Charles R. Wittemenn. Ills. 11 pp. Aer Soc Amer. Advantages of machine with a number of planes arranged tandem.

Hangars

L'Action Du Vent Et L'Art De Construire (73522 C + D). G. Espitallier. Ills. 4600 w. S E I N—July-Aug., 1916.

Hangars

Hydro-Aeroplanes

Action of the wind on hangars, with results of French and Italian experiments.

Hydro-Aeroplanes

Gl'Idrovolanti E La Guerra (72809 C + D). A. Guidoni. Ills. 3800 w. R M—June, 1916. Description of hydro-aeroplanes as developed by the Italian navy.

Military

The Fokker Monoplane (67028). Ills. 600 w. A A—Jan. 17, 1916. General description.

The M. F. P. Steel Warplane (69618). Ills. 800 w. A A—April 3, 1916. Brief description.

Specifications for Military Aeroplanes, April 24, 1916 (71407 A). 2500 w. Aern—June 14, 1916. Serial, 1st part. For military aeroplanes for U. S. Army.

The New Sturtevant Battleplane (66261 B). Ills. 700 w. A A—Dec. 27, 1915. Brief description of engine and construction features.

The Development of the Military Aeroplane: the Question of Size (69020 A). F. W. Lanchester. 4500 w. Eng—March 3, 1916. Investigation.

Planes

Variably-Curved Planes (65432 A). Robert Mallet. Ills. 2000 w. Aern—Oct. 10, 1915. Translated from *L'Aéroplane*. Account of experiments.

Propeller Hubs

Standardization of Propeller Hubs (70112 N). Charles L. Lawrence. Ills. 3 pp. Aer Soc Am JI—Mar.-Apr., 1916. Advantages.

Propeller Machine

The Wadkin Propeller-Shaping Machine (65497 A). Ills. 1000 w. Aern—Nov. 10, 1915. Device for reproducing exact shape of model.

Propellers

Note on the Dynamics of a Gyroscopic Particle with Special Reference to Periodic Stresses in a Propeller (73429). A. F. Zahn with calculations and diagrams by W. P. Loo. Ills. 1000 w. A A—Sept. 25, 1916. Considers cases of a rigid body and a non-rigid body.

Radiators

Notes on Radiators for Aeroplanes (70759). J. C. Hunsaker. 3000 w. A A—May 29, 1916. Theory and practice; radiator resistance, weight, &c.

Radius of Action

Aeroplani e dirigibili di grande raggio

AUTOMOBILES**Armored Cars**

d'azione (67061 C + D). A. Guidoni. Ills. 14 pp. R M—Dec., 1915. Mathematical discussion of factors affecting radius of action of flying machines.

Review of 1915

Aeronautics (67534 A). 2500 w. Enr—Jan. 7, 1916. General outline of progress.

Signaling

Communicating with Aircraft (66117). From *London Times Engng. Sup.* 1200 w. S A S—Dec. 4, 1915. Methods of signaling.

Specifications

Specifications Covering Requirements of Aeronautic Instruments for the Army (72467). 1600 w. A A—Aug. 14, 1916.

Sperry Pilot

The Sperry Automatic Pilot (72937 A). Lawrence B. Sperry. Ills. 1800 w. Fly—Sept., 1916. Its application for military purposes.

Triplane

Aerodynamic Properties of the Triplane (72295 A). J. C. Hunsaker and T. H. Huff. Ills. 1500 w. Eng—July 21, 1916. Investigation of triplane for weight-carrying.

Wind Effect

The Effect of Wind on Speed of Travel (68314 A). John H. Ledeboer. Ills. 800 w. Aern—Feb. 9, 1916. General consideration.

Wind Tunnels

U. S. Naval Experimental Wind Tunnel (67027). Ills. 600 w. A A—Jan. 17, 1916. Brief description.

Two Wireless Sets for Use on Aeroplanes (67022). Ills. 1000 w. A A—Jan. 10, 1916. Brief description of principal features.

Reports on Wind Tunnel Experiments in Aerodynamics (68827). J. C. Hunsaker. Ills. 1500 w. A A—Mar. 6, 1916. Serial, 1st part. Present number deals with Mass. Inst. Tech. tunnel.

Notes on the Dimensional Theory of Wind Tunnel Experiments (69651). Edgar Buckingham. 2000 w. A A—April 17, 1916. Serial, 1st part. From Smithsonian Institute Report.

Zeppelins

The Buoyancy of Zeppelins (69330 A). 2500 w. Enr—March 17, 1916. Also letter.

AUTOMOBILES**Accumulators**

What Happens to a Neglected Storage Battery (73629). J. Edward Schipper. Ills. 4500 w. Aut—Sept. 28, 1916. Importance of keeping it charged.

Armored Cars

British Use Many Armored Cars (67999). W. F. Bradley. Ills. 5000 w. Aut—Feb. 10, 1916. Protection; severe test; failures; operation and use.

Consult Classification of the Index. See page 7.

Army Trucks

New Armored Battlecar Harbinger of Efficient Defense (69747 A). Ills. 1600 w. C V—April 15, 1916. Mack truck.

Army Trucks

A Citizenry Trained and Accustomed to the Efficient and Economical Motor Transport of Freight, Demonstrates Heavy Trucks to Army Men (69746 A). Ills. 1500 w. C V—April 15, 1916. Report of test.

Assembling

Symptoms of trouble and how met.

Manufacture or Assembly of Parts (74004 B). H. M. Jewett, with discussion. Chart. 6000 w. S A E Bul—Sept., 1916. Considers whether it is better to make car parts or assemble them. See Assembly Methods, under *Machine Works and Foundries*.

Axles

Evolution of Rear Axle (72218 B). J. G. Perrin, with discussion. Ills. 5500 w. S A E, Bul—July, 1916. Development, and types.

Bevel-Gearing

The Principle of "Corrected" Bevel-Gearing (73115 A). Howard Ensaw. 1500 w. Mch W—Sept. 1, 1916. A method of eliminating "interference," which is often the cause of noise.

Brakes

Working Out the Rolls Royce Brake (67587). Charles J. Booth. Ills. 2500 w. Aut—Jan. 27, 1916. Experiments with materials led to adoption of asbestos as most satisfactory.

Getting Proper Brake Action with Hotchkiss Drive (69775). A. Ludlow Clayden. Ills. 1000 w. Aut—April 20, 1916. Precautions to prevent automatic application.

Brake Design Not Up to Par (73630). A. Ludlow Clayden. 2500 w. Aut—Sept. 28, 1916. Brakes inefficient, troublesome, and noisy.

Carburetors

Carburetors Classified (66539). Ills. 4500 w. Aut—Dec. 16, 1915. Suggests five divisions.

The Carburetor as a Vaporizer (68005). P. S. Tice. Ills. 2200 w. H A—Feb. 1, 1916. Serial, 1st part. Problem of thorough vaporization. New design.

The New Binks Racing Carburetor (68617 A). Ills. 900 w. Acr—Feb. 19, 1916. Details of design.

Tracing the Why of Carburetor Parts (69920). F. H. & F. O. Ball. 2500 w. Aut—April 27, 1916. Serial, 1st part. Compensating jets and air valves.

Effect of Compensating Jet (70328). V. R. Heftler. Ills. 2000 w. Aut—May

AUTOMOBILES**Cooling**

11, 1916. Design and operation of Zenith carburetor.

The Acme Carburetor (70997 A). Ills. 1200 w. Acr—May 27, 1916. Device claiming to give a correct mixture at all engine speeds.

The Standard Petroleum Carburetor (72518 A). Ills. 1500 w. Acr—July 29, 1916. Device by aid of which either petrol or paraffin can be used.

Carburetor Investigations (73352 B). Frank H. Ball and Frederick O. Ball, with discussion. Ills. 10000 w. S A E, Bul—Aug., 1916. Investigations of several types.

The Theory and Practice of Automobile Carburetion (74072 A). Lenox R. Lohr. Ills. 3000 w. S J1 E—Oct., 1916. Requisites of a good carburetor, conditions of operation, types, etc.

The Winkworth Paraffin Vaporizer (73699 A). Ills. 1600 w. Aut—Sept. 16, 1916. Paraffin substituted for petrol.

Car Tests

Simple Tests Show Car Condition (71607). Charles E. Manierre. 4500 w. Aut—July 6, 1916. How acceleration, speed, and fuel economy are interconnected.

Chain Drives

Laying Out Chain Camshaft Drives (66122). F. L. Morse. Ills. 4500 w. Aut—Dec. 2, 1915. Principles and problems.

Silent Chain Drive for Cam and Accessory Shafts (69463 B). F. L. Morse. 4000 w. S A E, Bul—March, 1916. Action, designs, manufacturing methods, advantages.

Chassis Testing

Chassis Testing Methods (72219 B). Peter Payne Dean, with discussion. 4000 w. S A E, Bul—July, 1916. Methods now in use.

Constant Pressure

Constant Pressure Efficiency 25 Per Cent Lower (72936). 2000 w. Aut—Aug. 31, 1916. Mathematical comparison of the two working cycles.

Cooling

Radiators and Cooling Systems (68590). P. M. Heldt. Ills. 3500 w. H A—March 1, 1916. Serial, 1st part. Radiators and manifolds in this number.

Analyzing Engine Cooling (68930). A. Ludlow Clayden. Ills. 3000 w. Aut—March 16, 1916. Serial, 1st part. Factors. Results of F. W. Lanchester's researches reviewed.

Cylinder Cooling (69311 A). Granville E. Bradshaw. Ills. 4000 w. Acr—March 18, 1916. Tests of designs.

Consult Classification of the Index. See page 7.

Crankshafts**Crankshafts**

Design of Crankshafts for High-Speed Engines (66164). P. M. Heldt. Ills. 2500 w. H A—Dec. 1, 1915. Serial, 1st part. Equations for proportions of types.

Cylinders

See Castings, under Machine Works and Foundries.

Design

The Automobiles of 1916 (66840 A). Ills. 28 pp. Aut—Dec. 30, 1915.

1916 Passenger Automobiles Listed with Their Technical Specifications (66841 A). 8 pp. 108 makes of cars and 176 chassis models.

Light Weight as an Ideal in the Designing of Large Cars (67424). 4500 w. Aut—Jan. 20, 1916. Possibilities for light car construction.

Trend and Possibilities of Automobile Design (68183). A. Ludlow Clayden and L. V. Spencer. Extracts from paper to the S. A. E. 5500 w. Aut—Feb. 17, 1916. Analysis; probable future.

Motor Vehicles; Passenger Type (68550 N). Ethelbert Favary. Ills. 40 pp. Int Eng Cong, Trans—Paper 130. Present status.

Motor Vehicles; Utility Type (68551 N). Arthur J. Slade. Ills. 27 pp. Int Eng Cong, Trans—Paper 131. Review.

Trend and Possibilities of Automobile Design (70275 B). A. Ludlow Clayden and L. V. Spencer, with discussion. 18 pp. S A E, Bul—April, 1916. Critical discussion.

Factors of Safety (71466 N). Russell Huff. 18 pp. S A E—June, 1916. Study of automobile design.

Art and the Motor Car (74007 B). William B. Stout, with short discussion. 2000 w. S A E Bul—Sept., 1916. The artist's opportunity in car design.

Differentials

Shall the Differential Be Abandoned? (69538). A. Ludlow Clayden. Ills. 1500 w. Aut—April 13, 1916. Tendency to eliminate; consideration of arguments for and against.

Differential Substitutes

Substitutes for the Differential (71082). D. D. Ormsby. Ills. 1500 w. Aut—June 15, 1916. Advantages and disadvantages of the various constructions.

Electrical Equipment

Mechanical Applications of Generators and Motors (66960). W. A. Dick. Ills. 1500 w. El JI—Jan., 1916. Features to secure good results.

Lighting and Starting Systems from the Car Manufacturer's Standpoint (66948) 4000 w. El JI—Jan., 1916. Solution of voltage, storage battery, starting motor, etc.

AUTOMOBILES**Engine Cycles**

Control Switches for Electrical Equipment of Gas-Driven Automobiles (66961). B. D. Kunkle. Ills. 1600 w. El JI—Jan., 1916. Arrangement of control units.

Regulation of Automobile Lighting Generators (66959). C. E. Wilson. Diagrams. 2500 w. El JI—Jan., 1916. Types used and systems of regulation.

One-Unit Starting and Lighting Automobile Equipments (66957). H. F. Patten. 2500 w. Types, performance, applications, limitations, points governing selection.

The Application of Electric Starting and Lighting to the Ford Car (66962). W. O. Lum. Ills. 1200 w. El JI—Jan., 1916. Problem and solution.

Automobile Electricity (69338). J. Edward Schipper. Ills. 4000 w. Aut—April 6, 1916. Locating and curing troubles.

Electricity in Car Transmission (72148 A). Ills. 1700 w. Acr—July 15, 1916. Résumé of various ways in which it may be utilized.

Electric Lighting and Starting (68249 B). Joseph Bijur. 7800 w. S A E, Bul—Jan., 1916. Principles involved.

Electric Transmission

A Car Without a Gear Box (68255 A). Ills. 1800 w. Acr—Feb. 5, 1916. Principles of form of transmission used on the Owen magnetic car.

The Electric Transmission on Owen Magnetic Cars (73353 B). J. B. Entz, with discussion. Ills. 3500 w. S A E, Bul—Aug., 1916. Wiring connections for various speeds.

Electric Trucks

Care and Operation of Electric Trucks (70401). Norman G. Meade. Ills. 1800 w. El A—May, 1916.

Electric Vehicles

Electric Efficiency Improved (67422). Ills. 6000 w. Aut—Jan. 20, 1916. Improvements in 1916 models.

Electric Passenger Cars (66950). Gail Reed. 4000 w. El JI—Jan., 1916. Development, present high standard.

Electric-Vehicle Practice of Large Brewery (66899). Ills. 3000 w. El R & W E—Jan. 1, 1916. Growing fleet and model garage in Detroit.

The Horse Versus the Electric Vehicle (67856). A. J. Marshall. 2000 w. El R & W E—Feb. 5, 1916. Comparative advantages in commercial service.

Edison Battery Vehicles in Municipal Service (71712 A). W. H. L. Watson. 2000 w. Eln—June 23, 1916. Report of results.

Engine Cycles

Constant Pressure Cycle Possibilities (71083). Arthur B. Browne and Herbert

Consult Classification of the Index. See page 7.

Engine Rating

Chase. Ills. 1800 w. Aut—June 15, 1916. Serial, 1st part. Comparison of engine cycles.

Engine Rating

Practical Engine Rating (74142). Edward G. Ingram. 2500 w. Aut—Oct. 26, 1916. Incorrect use of piston speed; effect of cylinder size, etc.

Engines

Vast Progress in Motor Design (65383). A. Ludlow Clayden. Ills. 5000 w. Automobile—Nov. 4, 1915. Improvements.

Stating the Case for the Eight (65384). Charles S. Crawford. From a paper read before the Indiana Sec. S. A. E. Ills. Also discussion. 7500 w. Automobile—Nov. 4, 1915. Compares eights and twelves for balance and efficiency.

Piston Practice (65876). James E. Diamond. Read before S. A. E. Ills. 6500 w. Automobile—Nov. 11, 1915. Advantages of aluminum alloy.

Aluminum Alloy Pistons (65548). Morris R. Machol. Ills. 3500 w. Horseless Age—Nov. 1, 1915. Advantages; comparison of cost.

Power Plants Are Simpler (66839 A). 3000 w. Aut—Dec. 30, 1915. Review of the year's progress.

Twelve-Cylinder Engines (66364 B). J. G. Vincent. Ills. Also discussion. 5000 w. S A E Bul—Nov., 1915. Serial, 1st part. Advantages, design and construction.

Engines for Petrol Commercial Vehicles (68279 N). W. D. Williamson. Ills. 50 pp. Inst Auto Engrs—Feb., 1916. Broad survey of governing features.

Unbalanced Forces in V Engines (68004). P. M. Heldt. Diagrams. 2000 w. H A—Feb. 1, 1916. Analysis.

Aluminum Alloy Piston Design (68514 A). James E. Diamond. Ills. 3000 w. S A E, Bul—Feb., 1916. Serial, 1st part. Advantages, characteristics, difficulties.

Increasing the Thermal Efficiency (69204). C. E. Sargent. 3000 w. Aut—March 30, 1916. Possibilities of altering the Otto cycle to obtain better fuel economy.

As to the Matter of Stroke (69337). Edward G. Ingram. Ills. 3500 w. H A—April 1, 1916. Effect of stroke-bore ratio.

Essentials of Racing Engines (69539). 3500 w. Aut—April 13, 1916. Details discussed by mid-west section S. A. E.

I. The Case for the Four. J. Edward Schipper. II. Automobile Applications of Four-cylinder motors. F. E. Watts. III. Internal Combustion Motors. F. R. Porter (69919). 6000 w. Aut—April 27,

AUTOMOBILES

Farm Tractors

1916. Resume of situation; possibilities, etc.

Possibilities of Double Expansion Engine (70090). James Langmuir Napier. Ills. 3000 w. Aut—May 4, 1916. Economical power obtainable.

A V-Type Engine (70274 B). Arthur M. Dean, with discussion. Ills. 4000 w. S A E, Bul—April, 1916. Development of the "American V-Type Engine."

A Study of High-Speed Engines (71080). A. P. Brush. Ills. 3000 w. Aut—June 15, 1916. Abstract of paper read before S A E. Reasons for existence. Problems of design.

The Multi-Cylinder Motor (70986 A). Lenox R. Lohr. Ills. 2500 w. S J E—June, 1916. Mechanical advantages.

The Valente Radial Cylinder Steam Engine (70739 A). Ills. 1600 w. Acr—May 13, 1916. New rotary engine for which great power-for-weight capacity is claimed.

Aluminum Engines Coming in France (71608). W. F. Bradley. Ills. 2000 w. Aut—July 6, 1916. Engines without cylinder liners.

Increasing the Thermal Efficiency of Automobile Engines (72220 B). C. E. Sargent with discussion. 4500 w. S A E, Bul—July, 1916. Suggests a method of converting more of the heat of the fuel into useful work.

Temperature Control Will Be Elaborate (73381). 2800 w. Aut—Sept. 2, 1916. Discussion at Detroit. Need for different temperatures leads to automatic devices.

Truck and Tractor Engines (73051). H. L. Horning. 2000 w. Aut—Sept. 7, 1916. Serial, 1st part. Differences in demands on engines for use in trucks and tractors.

An American Racing Engine (74010 B). Charles H. John. Ills. 1500 w. S A E Bul—Sept., 1916. Engine types and details.

Engine Temperature Control (74003 B). C. F. Kettering, with discussion. 10500 w. S A E Bul—Sept., 1916. Its effect on lubrication, difficulties in winter operation, ignition, etc.

Farm Tractors

Traction mécanique et motoculture (65428 B). B. et L. La Nat—Oct. 23, 1915. Recent developments in field of farm motor traction.

Revue de culture mécanique (66217 C + D). Max Ringelmann. Ills. 45 pp. S E I N Bul—Sept.-Oct., 1915. Review of progress in adaptation of electric and combustion motors to plowing, etc. Exhibitions, tests, accessory apparatus.

Culture mécanique et tracteurs agricoles (66236 B). Ills. 2500 w. G C—

Frames

Dec. 4, 1915. Serial, 1st part. Review of subject of mechanical tractors for plows, etc.

Some French Power Ploughing Trials (66835 A). 3000 w. Enr—Dec. 17, 1915. Serial, 1st part. Trials under Government auspices.

Motor Implements at the Yorkshire Agricultural Society's Trials (66076 A). Ills. 2500 w. Eng—Nov. 19, 1915. Describes exhibits.

Motorpflüge (67704 B). Gustav Fischer. Ills. 4000 w. Z V d I—Jan. 1, 1916. Serial, 1st part. Theory and examples of motor plows.

Requirements of Tractor Design (67805). C. M. Eason. 1200 w. Extract from paper read before Agri. Engrs'. Convention. Aut—Feb. 3, 1916. Present tendencies.

The Lefebvre Agricultural Tractor (69321 A). Ills. 700 w. Eng—March 17, 1916. French machine.

The Development of the Farm Tractor (74017 A). Sterling H. Bunnell. Ills. 1500 w. I A—Oct. 19, 1916. Review of development and future stability.

Frames

Determining Frame Sections (68365). A. L. Nelson. 2500 w. Aut—Feb. 24, 1916. Section modulus and characteristics.

Front Drive

The Lavolette Front Wheel Drive (66063 A). Ills. 2000 w. Acr—Nov. 20, 1915. Belgian design with worm transmission.

Fuels

Versuchergebnisse mit Benzolspiritusmischungen bei dem Betrieb von Kraftwagen (65417 B). Frhr. v. Löw. Ills. 1200 w. Aut-Rnd—Sept., 1915. Results of experiments with benzol-alcohol mixture for driving automobiles.

Ueber Benzol (65418 B). P. Martell. 2000 w. Aut-Rnd—Sept., 1915. Brief note on nature and use of benzol in automobiles.

Trying Direct Fuel Spray (67804). W. F. Bradley. Ills. 1000 w. Aut—Feb. 3, 1916. French attempt to use kerosene.

The Automobile Fuel Situation (69037 N). E. S. Foljambe. 16 pp. S A E—March, 1916. Methods of relief.

The Problems of Kerosene (69203). A. Ludlow Clayden. Ills. 4500 w. Aut—March 30, 1916. Difficult to explode.

Fuel Tests at Brooklands (69572 A). 2500 w. Acr—March 25, 1916. Special compound.

Kerosene versus Gasoline in Standard Automobile Engines (71469 N). Charles E. Lucke. Ills. 37 pp. S A E—June,

AUTOMOBILES

Headlights

1916. Principles upon which satisfactory kerosene equipment can be designed.

The Gasoline Question (70984). 2500 w. W E—June, 1916. Standard Oil Co. not responsible for raised prices.

Paraffin as Fuel (70738 A). Ills. 2500 w. Acr—May 13, 1916. A conversion device, with notes on a test.

Paraffin for Petrol Engines (72015 A). Ills. 800 w. Enr—July 7, 1916. Appliances for its use.

White Oils (72002 A). 1500 w. Acr—July 8, 1916. Petroleum distillates between benzines and the paraffins.

The Problem of Petrol and Its Alternatives (72725 A). 4500 w. E Rv—Aug. 15, 1916. Considers alcohol the motor fuel of the future.

Great Kerosene Activity in England (73053). A. Ludlow Clayden. Ills. 1500 w. Aut—Sept., 1916. Development of heavy fuel carburettors.

Gear Box

Gear Box Design (70737 A). Granville E. Bradshaw. Ills. 3000 w. Acr—May 13, 1916. Particularly with a view to easy changing.

Gear Changing

The Laidman Gate Control (72278 A). Ills. 2000 w. Acr—July 22, 1916. Device to simplify gear changes.

Gear Control

The Leicester Gear Control (71735 A). Ills. 2000 w. Acr—July 1, 1916. Ingenious change-speed mechanism, of interest to those who have lost an arm.

Gears

Spiral Bevel Calculations (70897). A. L. Nelson. 2500 w. Charts. Aut—June 8, 1916. Study of radial and thrust loads.

Summing Up the Truck Final Drive Situation (70756). A. Ludlow Clayden. Ills. 2500 w. Aut—June 1, 1916. Origin and special qualities of gear and worm axles.

Gearsets

Gearsets Are Smaller and Lighter (65820). Ills. 1800 w. Automobile—Nov. 18, 1915. Development.

Glare

Eliminating Glare Is Easy (74042). A. Ludlow Clayden. Ills. 1200 w. Aut—Oct. 19, 1916. Cause and prevention.

Governors

Automobile Engine Governors (68250 B). Ills. 2500 w. S A E, Bul—Jan., 1916. Report of research committee.

Headlights

Automobile Headlights (68866 C). 11 pp. J E S Trans—Feb. 10, 1916. Committee recommendations.

Consult Classification of the Index. See page 7.

Hospital Car

Report of Electrical Equipment Division (68512 A). 4000 w. S A E, Bul—Feb., 1916. Glare problem, etc.

Hospital Car

An Itinerant X-ray Equipment (69578 A). Ills. 1500 w. Acr—April 1, 1916. Austin car and equipment.

Voiture Sanitaire Exshaw de la Croix Rouge française (72783 B). Ills. 1400 w. Gn Cv—July 15, 1916. Army motor car with bathing, disinfecting and laundry facilities recently built for the French Red Cross.

Ignition

Ignition Systems Improved in Detail (66347). J. Edward Schipper. Ills. 7000 w. Aut—Dec. 9, 1915. Progress during past year.

Magneto versus Battery Ignition (66857 N). Francis R. Hoyt. Ills. 2500 w. S A E—Jan., 1916. Comparative analysis.

Battery versus Magneto Ignition (66855 N). Frank Conrad. 1500 w. S A E—Jan., 1916. Distinctions between systems.

Notes on Battery Ignition (66856 N). Alexander Churchward. Ills. Oscillograms. 500 w. S A E—Jan., 1916. Types. Troubles of starting.

Methods of Ignition (66964). J. B. Dyer. Ills. 2500 w. El JI—Jan., 1916. Improvements in developing ignition system.

Storing and Releasing Energy (66958) R. P. Jackson. Ills. 1500 w. El JI—Jan., 1916. Mechanical analogies to battery ignition.

Battery v. Magneto Ignition (69873 A). Frank Conrad. From paper before S. A. E. 1400 w. Mch W—April 14, 1916. Mechanisms.

Magnetos for Electric Ignition (69575 A). H. Armagnat. Abbreviated translation from *La Rev. Elec.* Ills. 3000 w. Eln—March 24, 1916. Serial, 1st part. History and theory.

Magneto Ignition of Eight and Twelve-Cylinder V-Engines (69461 B). R. H. Cunningham, with discussion. 3000 w. S A E, Bul—March, 1916. Early and recent practice.

Battery v. Magneto Ignition (72571 A). 1700 w. Acr—Aug. 5, 1916. Arguments in favor of the battery system.

Securing Even Power in Cylinders (72553). Robert Antony. Ills. 4000 w. Aut—Aug. 17, 1916. Diagrams showing effect of alteration in order of firing.

Indicators

Recent Developments in Optical Indicators (65549). Ills. 1200 w. Horseless Age—Nov. 1, 1915. New two mirror in-

AUTOMOBILES**Magnetos**

strument recently developed in England. Also Schulze single mirror indicator.

Use of Optical Indicators for Checking Defects in Functioning of Motors (65997). Ills. 3500 w. Automobile—Nov. 25, 1915. Serial, 1st part. From the German viewpoint as given in *Auto-Technik*.

Industrial Tractors

Tractor Haulage in Terminals and Warehouses (69214). G. W. Bully. Ills. 3000 w. Elec Veh—March, 1916. Control, driving, steering, costs.

Industrial Trucks

Motor Trucks as the Solution of the Marine Freight Terminal Problem (66991 A). Merrill C. Horine. Ills. 2200 w. I Mr E—Jan., 1916. Economy possible.

Italian Industry

Italian Trade Profits by War (67423). W. F. Bradley. Ills. 2500 w. Aut—Jan. 20, 1916. Serial, 2nd part. Prosperous automobile and truck conditions.

Jet Control

The Berdea Jet Control (66627 A). Ills. 1400 w. Acr—Dec. 4, 1915. Method of regulating mixture from driver's seat.

Kitchen Cars

Der Küchenwagenzug des deutschen Kaisers (66213 B). Ills. 1200 w. Au-R—Oct., 1915. General description of field-cooking automobile for Kaiser.

Lighting

Lighting Systems Simplified (66121). A. Ludlow Clayden. Ills. 5000 w. Aut—Dec. 2, 1915. Improvements for 1916.

Electric Bulbs for Automobiles (66854 N). Henry Schroeder. Ills. 2500 w. S A E—Jan., 1916. Manufacture and characteristics of tungsten filaments and lamps.

What Good Lighting Really Is (68561). Emerson L. Clark. Read before Cleveland Sec. of S. A. E. Ills. 7500 w. Aut—March 2, 1916. Serial, 1st part. Analyzed from lighting viewpoint.

Lubrication

Irish Car is Self-Lubricating (66348). Ills. 2500 w. Aut—Dec. 9, 1915. British car with every portion of chassis automatically lubricated.

Why Crawl to Oil? (66064 A). Ills. 1000 w. Acr—Nov. 20, 1915. Lubrication of Guy chassis.

Imperfections of Lubrication (69774). C. W. Stratford. Ills. 2500 w. Aut—April 20, 1916. Manner of contamination.

Improving Splash Oiling (70325). L. V. Spencer. Ills. 2500 w. Aut—May 11, 1916. Suggestions and criticisms.

Magnetos

New Magneto Very Simple (71941). Ills. 1200 w. Aut—July 20, 1916. Details of the Berkshire magnetos.

Consult Classification of the Index. See page 7.

Manifolds

Les Magnetos d'Allumage (74236 B). J. Sarrian. Ills. 2400 w. La Nt—Oct. 14, 1916. Description of magnetos now used on French motors.

Manifolds

The Design of Induction and Exhaust Manifolds (72001 A). L. Mantell. 3000 w. Acr—July 8, 1916. Criticism of modern practice.

Military

Das Automobil im Kriege (65416 B). Hofmann-Braunschweig. 3000 w. Aut-Rnd—Sept., 1915. General discussion of the performance of automobiles in the present war.

Motor Trucks and Modern Warfare (65510). Joseph Brinker. Ills. 2800 w. Sci Am—Nov. 6, 1915. Subsidy systems.

Motor Buses

The Paris Motor-Buses (69879 A). Plate. 2200 w. Eng—April 14, 1916. Serial, 1st part. Reviews service.

Motor Tests

The Testing of Automobile Motors (73045 A). Ferdinand Jehle. Ills. 3000 w. S JI E—Aug., 1916. Outline of complete test, with methods and apparatus.

Motor Trucks

Dummies Play Important Part in Fender Tests (65568). Ills. 1000 w. Eng Rec—Nov. 6, 1915. Specifications for motor-truck fenders.

Motor Trucks After the War (66290 A). Rollin W. Hutchinson, Jr. Ills. 5500 w. E M—Jan., 1916. Effect will be to increase demand, lower prices, improve design and stimulate the industry in every way.

Motor Efficiency Proven by Macy & Co. Investigation (66502 A). 9000 w. C V—Dec. 15, 1915. Study of delivery system made by Research Division of Mass. Inst. of Technology.

Keep the Wheels Turning to Make Motor Trucks Profitable for Contractors (66383). Ills. 1800 w. E R—Dec. 11, 1915. Suggestions for the use, operation and maintenance.

Making Motor Truck Pay on Short Hauls (66386). Ills. 2000 w. E R—Dec. 11, 1915. Efficiency test.

Motor Trucks for 1916 (67369 A). Ills. 40 pp. C V—Jan. 15 1916. Construction, standardization, efficiency, with specifications of 408 American gasoline commercial vehicle chassis.

The Commercial Motor Vehicle for Railway and Industrial Purposes (67926 A). Ills. 3000 w. R G—Jan. 21, 1916. Serial, 1st part. The present article gives information concerning the use by the Great Western Ry.

The Commercial Motor Vehicle for Railway and Industrial Purposes (69015

AUTOMOBILES

Motor Trucks

A). Ills. 1500 w. R G—March 3 1916. "Caledon" commercial motors.

Details of the "Peerless" Motor Truck (68915 A). Ills. 1000 w. Eng—Feb. 25, 1916.

New Construction Details Seen at the Boston Show and How the Brakes of Several Trucks Are Adjusted (69748 A). Ills. 1200 w. C V—April 15, 1916.

Preparedness and Motor Trucks (70899). Donald McLeod Lay. Ills. 2500 w. Aut—June 8, 1916. Serial, 1st part. Lessons learned from service in European war.

Automobile Experience in the Great War (71187). W. F. Bradley. 5000 w. C V—June 15, 1916. Serial, 1st part. Types, defects, requirements, fuel, etc.

Commercial Motor Vehicles for Railway and Industrial Purposes (71171 A). Ills. 1200 w. R G—June 9, 1916. Types of "Commer" cars.

Mechanical Transport Mobilization (71465 N). Arthur J. Slade. 1500 w. S A E—June, 1916. Report of experimental trips made by motor-truck owners.

Refinements and Generalities in Truck Design (71286 B). H. D. Church. Ills. 3300 w. S A E, Bul—May, 1916. Detailed developments.

Motor Truck Operation at Mammoth Collins Mine, Shultz, Ariz. (71761 D). Wilbert G. McBride. 4 pp. A I M E, Bul—July, 1916. Operating data and costs.

Commercial Motor Vehicles for Railway and Industrial Purposes (72003 A). Ills. 2500 w. R G—July 7, 1916. Serial, 1st part. Detailed description of the "Karrier" W. D. S. motor lorry.

Conserving the Minutes in Motor Truck Operation (72506 A). A. P. Lee. Ills. 2500 w. Cnr—Aug. 15, 1916. Serial, 1st part. Proper operation.

Ford Adapters Designed to Produce Vehicles of 1-Ton Capacity at Low First Cost (72508 A). Ills. 2000 w. C V—Aug. 15, 1916. Serial, 1st part. Types.

Making Motor Trucks in the White Plant (72475 A). F. L. Prentiss. Ills. 2500 w. I A—Aug. 17, 1916. Production methods.

An Analysis of the Motor-Truck Question (73069). Ills. 2000 w. Cl A—Sept. 9, 1916. Methods employed in leading cities in using them for transporting coal.

Commercial Motors for Railway and Industrial Purposes (73000 A). Ills. 1300 w. R G—Aug. 18, 1916. Recent Wolseley commercial vehicles.

Big Possibilities for the Motor Truck in the Inter-city Haulage of Freight

Nomenclature

(73281 A). 5500 w. C V—Sept. 15, 1916. Successful applications in competition with railroad service.

Commercial Motor Vehicles for Railway and Industrial Purposes (73446 A). Ills. 3000 w. R G—Sept. 8, 1916. Tilling-Stevens petrol-electric vehicles.

Choosing a Motor Truck (74009 B). Henry Farrington. 3000 w. S A E Bul—Sept., 1916. Suggestions for selection to suit the work expected.

Hints for Trucking Contractors (74012). Ills. 1000 w. E & C—Oct. 18, 1916. Ills. and extracts from a booklet, "Devices That Make for Motor Truck Efficiency."

Mechanical Transport in the Army (73717 A). 3000 w. Eng—Sept. 22, 1916. Scope of organization included in the working since the beginning of war.

Motor Trucks Equipped for Construction Service (73613). Ills. 2500 w. El W—Sept. 30, 1916. Trucks with both electrical and mechanical equipment.

Motor Trucks in Southern California (73750 A). W. Howard Clapp. 7500 w. A S M E JI—Oct., 1916. Economics of truck operation.

The Use of Motor Vehicles in Municipal Work (73701 A). H. Shaw. 5500 w. S M C E—Sept. 15, 1916. Serial, 1st part. Facts from experience of various municipalities as to advantages of mechanical v. horse traction.

Wisconsin's Pioneer Part in the Development of the Motor Vehicle and Farm Tractor (73964). John S. Donald. Ills. 3300 w. Wis E—Oct., 1916. Reviews the history of the first motor vehicles.

Nomenclature

Report of Nomenclature Division (71467 N). 20 pp. S A E—June, 1916. Proposed classification based upon function.

Automobile Nomenclature (73989 N). 22 pp. S A E—Aug., 1916. Includes names of car parts and items of terminology. From report adopted Aug. 1, 1916.

Omnibuses

Omnibus Construction Graduated from Both Peace and War Service (70900). Ills. 1000 w. Aut—June 8, 1916. Details of Paris types.

Performance

Car Performance (71280 B). D. L. Gallup. 2500 w. S A E, Bul—May, 1916. General suggestions for tests.

Automobile Performance and Methods of Comparison (74041). Walter T. Fishleigh, with discussion. 3000 w. Aut—Oct. 19, 1916. Analysis of factors testing performance.

Pistons

Secret of Aluminum Piston Success (72667). A. Ludlow Clayden. 1700 w.

AUTOMOBILES

Aut—Aug. 24, 1916. Service depends on correct design and correct alloy.

Presidential Address

Presidential Address to the Institution of Automobile Engineers (74121 N). L. A. Legros. Ills. 28 pp. I A E—Oct., 1916. Remarks on automobile engines, education, employment, labor, etc.

Production

754,902 Passenger Cars Made in First 6 Months of 1916 (71939). J. Edward Schipper. Ills. 3500 w. Aut—July 20, 1916. Statistics of industry.

Progress

Transcendancy (66838 A). 3500 w. Aut—Dec. 30, 1915. Factors which have brought the remarkable progress during past year.

Prospects

Die Aussichten für die Motorenindustrie nach dem Kriege (67041 B). K. Bilau. Ills. 1800 w. Au-R—Nov., 1915. Prospects for automobile development after the war.

Racing Cars

1916 Racing Cars at Sheepshead (70327). Ills. 2000 w. Aut—May 11, 1916. Details of designs.

Radiators

Radiator Design a Neglected Factor (71501). 2500 w. Aut—June 29, 1916. Pros and cons of various designs.

Rear Axles

Floating Bush Bearings in Live Rear Axles for Trucks (68560). From paper by George W. Watson. Ills. 1500 w. Aut—March 2, 1916. British opinion.

Rectifiers

The Field of Mechanical Rectifiers (66949). A. L. Atherton. Ills. 2500 w. El JI—Jan., 1916. Details of Westinghouse vibrating rectifier.

The Mercury Arc Rectifier for Charging Electrical Vehicle Batteries (66955). Q. A. Brackett. Ills. 2000 w. El JI—Jan., 1916. Details of types and explanation of advantages.

Refrigerator Automobiles

Les automobiles frigorifiques de l'armée Italienne (65463 B). Gouriet. Ills. 1200 w. Gen Civ—Oct. 23, 1915. Cold-storage machines for transporting meat to Italian troops at front.

Repairs

Truck Repair System of French Army Eliminates Junk Heap (72232 A). W. F. Bradley. Ills. 2500 w. C V—Aug. 1, 1916. Methods used.

Road Locomotives

New Gas-electric Tractor—A Road Locomotive (65373 A). Ills. 700 w. Com Veh—Nov. 1, 1915. German machine operating on multiple unit plan.

Consult Classification of the Index. See page 7.

Road Traction

Road Traction

Road Traction by Petrol, Steam and Electric Motor Vehicles (68626 A). G. Martin Gamble. Abstract. 1500 w. S M C E—Feb. 18, 1916. Relative spheres.

Russian Industry

Condition and Development of the Automobile Industry in Russia (67421). Nicolas Kouznetzoff. 2000 w. Aut—Jan. 20, 1916. Development since 1907.

Sand Spreaders

Motor Sand Spreaders Prevent Slips and Skids on Gotham and Frisco Streets (69284). Ills. 800 w. C V—April 1, 1916. Types, cost of operation.

Speed Gears

The Thomas Transmission System. With a Note on the Armstrong-Whitworth Road Train (71624 A). Ills. 3500 w. E Rv—June 15, 1916. Electro-mechanical variable speed gear.

Speedometer

Waltham Speedometer (69205). Ills. 1500 w. Aut—March 30, 1916. Detailed description.

Springs

Scientific Spring Making (65663 A). Ills. 2500 w. Autocar—Oct. 30, 1915. American mechanical processes.

Fifth Report of the Springs Division (66853 N). Ills. 1500 w. S A E—Jan., 1916. Proposed specifications.

Fifth Report of the Springs Division (68248 B). Ills. 1000 w. S A E, Bul—Jan., 1916. Specifications.

Eine Studie über Wagenabfederungen (67720 B). K. Bilau. Ills. 3000 w. Au R—Dec., 1915. Development and theory of wagon springs.

Results from a Special Spring Suspension Developed for Brewery Trucks and Applicable to Automobiles (68931). Marius C. Krarup. Ills. 4000 w. Aut—March 16, 1916. Data from exceptional installation.

Adjustable Fulcrum for Cantilever Springs (70758). Ills. 2500 w. Aut—June 1, 1916. Theory and practical solution for springs of variable flexibility.

Self-Tensing Springs for Varying Loads Compared with Adjustable, with Special Reference to the North Cantilever Spring with Adjustable Fulcrum (71081). Marius C. Krarup. Ills. 3000 w. Aut—June 15, 1916.

Getting Correct Front Spring Action (72425). H. H. Dyke. Ills. 1800 w. Aut—Aug. 10, 1916. Methods of mounting automobile front springs.

No Magic in Spring Design (73052). A. Ludlow Clayden. Ills. 2500 w. Aut—Sept. 7, 1916. All types give equivalent results.

AUTOMOBILES

Standardization

Cheapening Cars by Reducing Varieties (69339). William Kent. 2500 w. Aut—April 6, 1916. Possibilities.

Industry's Elevator Service (69537). A. Ludlow Clayden. 2000 w. Aut—April 13, 1916. Advantages of standardization.

Starters

The Dyneto Starting and Lighting System (69119 A). 1500 w. Acr—March 11, 1916.

Steam Car

A New American Steam Car (74078 A). Ills. 1500 w. Acr—Oct. 7, 1916. Claims by makers of the Doble steamer.

Steering

Steering Gears Offer Many Problems (65819). A. Ludlow Clayden. Ills. 2200 w. Automobile—Nov. 18, 1915. Opportunities for design.

Verbesserung der Schraubenspindelsteuerung (65438 B). C. Rath. Ills. 2000 w. Schiffbau—Oct. 13, 1915. Details of mechanical improvements in screw-spindle steering mechanism.

Storage Batteries

Battery Charging Equipment (66954). T. H. Schoepf and A. M. Candy. Ills. 7000 w. El JI—Jan., 1916. Types, methods of charging, characteristics, etc.

Charging Edison Storage Batteries (66953). E. J. Ross, Jr. Ills. 1200 w. El JI—Jan., 1916. Details of methods.

Operating Characteristics of Lead Acid Storage Batteries (66951). J. H. Tracy. 2500 w. El JI—Jan., 1916. Permissible rates of discharge and behavior of batteries.

Small Motor-Generator Sets for Charging Starting, Lighting, and Ignition Batteries (66956). H. A. Campe. Ills. 800 w. El JI—Jan., 1916. Details and suggestions.

Street Flushers

Motor Street Flushers Effect Large Economies (72941 A). Ills. 1500 w. C V—Sept. 1, 1916. Types and styles.

Suspension

An Adjustable Cantilever Suspension (65771 A). Ills. 1500 w. Autocar—Nov. 6, 1915. Invention of O. D. North. Device giving equal comfort with light or full loads.

On the Dynamics of Vehicle Suspensions (71282 B). Benjamin Liebowitz. Ills. 8000 w. S A E, Bul—May, 1916.

Taxation

Regulation of Weight, Size and Speed of Vehicles Has Become an All-Important Problem (71136). H. C. Hutchins. Ills. 2500 w. E R—June 17, 1916. Tax schedules proposed, based on load per unit tire width, and also on width of vehicle.

Tires

AUTOMOBILES

Valves

Tires

Standardization of Automobile Tire Fabric Testing (69162 N). Walter S. Lewis and Charles J. Cleary. Ills. 15 pp. U S B S, Tech paper 68—March 17, 1916. Tests.

Wrong Tire Pressures Cause Rapid Wear (68987). Reginald Trautschold. 1500 w. E R—March 18, 1916. Chart, and method of determining load.

The Searle Unburstable Inner Tube (68619 A). Ills. 2000 w. Acr—Feb. 19, 1916. Difficulties of production.

Common Abuses That Shorten the Life of Motor Truck Tires (69750). A. H. Leavitt. Ills. 1000 w. E & C—April 19, 1916.

The Mustikon System of Tube Repairing (69571 A). Ills. 1000 w. Acr—March 25, 1916. Simple method.

The History of the Pneumatic Tire (70091). David Beecroft. 600 w. Aut—May 4, 1916. Serial, 1st part. As factors of automobile development, in connection with history of industry.

Large Single versus Dual Solid Tires for Rear Truck Wheels (71284 B). W. H. Allen. 2500 w. S A E, Bul—May, 1916. Favors single tires.

The Pneumatic Tire and Rim Situation (71283 B). J. E. Hale. Ills. 3000 w. S A E, Bul—May, 1916. Reviews development. Favors the straight-side tire.

Pneumatic Tire and Rim Situation (71776). J. E. Hale. Ills. 3500 w. Aut—July 13, 1916. Comparison of types; cost of operation, reliability, etc.

Traction

Traction Resistances to a Motor Delivery Wagon on Different Roads and at Different Speeds (71233 D). A. E. Kennelly and O. R. Schurig. 28 pp. A I E E, Pro—June, 1916. Report of investigation.

Tractors

Tractors and Trailers in Municipal Work (66349). Ills. 2200 w. Mun JI—Dec. 9, 1915. Examples of use and statement of advantages.

The Trackless Train (66952). G. W. Bulley. Ills. 3500 w. El JI—Jan., 1916. Industrial tractors, control, operating costs.

Motor Tractors (68552 N). Frank S. Davis. Ills. 27 pp. Int Eng Cong, Trans—Paper 132. Development; present status.

The Farm Tractor (71285 B). C. M. Eason. 4800 w. S A E, Bul—May, 1916. Problems of design, requirements, etc.

The Omnitractor at the Manchester Show (71840 A). Ills. 1200 w. Eng—June 30, 1916. Detailed description.

Advantages of Caterpillar Tractors (72304). Ills. 3500 w. Aut—Aug. 3,

1916. Serial, 1st part. Experience with this type.

Automobile Practice in Tractor Design (73227). A. Ludlow Clayden. Ills. 2500 w. Aut—Sept. 14, 1916. Problems of design, tendencies, and details.

Tractor Drives Knotty Problem (73380). A. Ludlow Clayden. Ills. 3000 w. Aut—Sept. 21, 1916. Advantages of caterpillar, two-wheel and one-wheel drives depend on nature of work.

Tractor Transmission Serious Problem (73631). A. Ludlow Clayden. Ills. 2000 w. Aut—Sept. 28, 1916. Fourth of a series of articles studying tractor requirements.

Traffic

Regulating Motor - Vehicle Traffic (72722). 3500 w. El R JI—Aug. 26, 1916. Three papers read at Tacoma.

Trailers

Trailer Economy Makes Trucks More Efficient (65372 A). Joseph Husson. Ills. 2500 w. Com Veh—Nov. 1, 1915. Serial, 1st part. How savings are effected.

When Is It Feasible and Economical to Use Trailers with Motor Trucks? (69118). 2000 w. E R—March 25, 1916. Dynamometer tests.

Transmission

A Car with Electro-Magnetic Transmission (65958). Ills. 1000 w. Sci Am—Nov. 27, 1915. A solution of the change-speed gear problem.

Extraordinary Transmission System (70326). A. Ludlow Clayden. Ills. 1000 w. Aut—May 11, 1916. Danish design eliminates rear axle.

From Engine to Axle (69858 N). B. W. Shilson. Ills. 52 pp. I A E—April, 1916. Thorough discussion.

Universal Joint

Factors in Universal Joint Design (70631). A. Ludlow Clayden. Ills. 2500 w. Aut—May 25, 1916. Serial, 1st part. Read at Cleveland Section S. A. E. Rules for determining size. Protection and lubrication important.

Factors in Universal Joint Design (74006 B). A. Ludlow Clayden, with short discussion. Ills. 4000 w. S A E Bul—Sept., 1916. Problems in providing an efficient, silent, and durable construction.

Valves

The Rise of the Overhead Valve (70340 A). W. A. Brush. Ills. 4000 w. Acr—April 29, 1916. Proper location of valve in cylinder.

Power Lies in Valve Proportions (70630). A. Ludlow Clayden. 2000 w. Aut—May 25, 1916. Need for large valve areas controls design of racing cars.

Consult Classification of the Index. See page 7.

Wheels

New Type of Balanced Rotary Valve (70988 A). R. J. Gilcher. Ills. 700 w. S J1 E—June, 1916. Design for automobile gas engines.

Wheels

The Search for the Army Truck Wheel (71273). Marius C. Krarup. Ills. 2000 w. Aut—June 22, 1916. Serial, 1st part. Composite type is considered best for the purpose.

Worm Drives

Manufacture of Motor Truck Worm

COMBUSTION MOTORS**Diesel Engines**

Drives (70903 A). F. L. Prentiss. Ills. 1400 w. I A—June 8, 1916. Processes.

Worm Gears

The Worm Gear, Pro and Con (70431 A). Ills. 4500 w. C V—May 15, 1916. Debate between experts.

Wrecked Cars

Rejuvenating Wrecked Cars (71500). W. F. Bradley. Ills. 3000 w. Aut—June 29, 1916. French economy in repairing war-worn cars.

COMBUSTION MOTORS**Air Compressors**

Accident to a Diesel Engine Air Compressor (69713 A). 2500 w. Mch E—April 7, 1916. Accident and the cause.

Blast-Furnace Gas

Modern Development in the Combustion of Blast-Furnace Gas with Special Reference to the Bradshaw Gas Burner (67961 D). K. Huessener. Charts. 32 pp. A I M E, Bul—Feb., 1916. Principles; economy.

Brons Engine

Iets over den Bronsmotor en daarmede genomen proeven (67701 B). J. C. Horsch. Ills. 4000 w. Ing—Jan. 8, 1916. Serial, 1st part. Description and performance of Dutch oil engine, the Brons.

Carbureters

Carburetter for Internal-Combustion Engines (65385 A). Ills. 900 w. Mech Engr—Oct. 22, 1915. Device for controlling engine speed.

Carburetion (73905). Edward E. Dean. Ills. 2500 w. P E, C—Oct. 15, 1916. Methods and types of carbureters.

Carburetion with Different Grades of Fuel (73942). E. N. Percy. Diagrams. 700 w. Pwr—Oct. 17, 1916. Results of tests with gasoline, kerosene, and distillate under different methods of governing.

Combined Plants

Oil Engines and Steam Engines in Combination (72296 A). Geoffrey Porter. Read before the Diesel Engine Users Assn. 4000 w. Eng—July 21, 1916. Problems met in increasing the power of generating stations.

Oil Engines and Steam Engines in Combination (72280 A). Geoffrey Porter. Read before Diesel Engine Users Assn. 4000 w. Eln—July 21 1916. Shows the economy effected by running Diesel plant in combination with steam plant.

Combustion Cycles

Are Other Cycles Possible? (69773). J. Edward Schipper. Ills. 3000 w. Aut—April 20, 1916. Suggests cycles other than Otto may prove useful.

Compression

The Influence of Compression in Internal-Combustion Engines (69436). R. E. Mathot. 2500 w. Pwr—April 11, 1916. Analysis.

Cylinders

Design of Gas Engine Cylinders (74008 B). E. Planche. 1500 w. S A E Bul—Sept., 1916. Points of importance for designers.

Diesel Engines

The Diesel Engine and Its Applications in Southern California (65604 A). Walter H. Adams. Ills. 6000 w. Am Soc Mech Engrs, Jour—Nov., 1915. Read at San Francisco. Outlines design and tendencies and operation with various fuels.

McIntosh & Seymour 500-Hp. Diesel Engine (66036). F. R. Low. Ills. 3000 w. Power—Nov. 30, 1915. Vertical 4-cylinder engine.

The Diesel Engine (67510 A). E. A. Garrett. Ills. 1200 w. S J1 E—Jan., 1916. Noteworthy American type recently built.

Experience with the Diesel Engine in the Municipal Power Plant of Palo Alto, Calif (67226). Ills. 3000 w. E & C—Jan. 12, 1916. Read before League of Calif. Munic.

Heat Maladies of Marine Diesels (68252). R. W. Crowley. 5000 w. Pwr—Feb. 22, 1916. Troubles due to distortion in large engines.

Effect of Diesel Engines on Fuel Supply and Cost (68149). S. A. Hadley. Read before Kansas Engng. Soc. 1600 w. E & C—Feb. 16, 1916. Possible savings as compared with other types.

Diesel Oil Engines (67828 A). W. E. Bernd. 2000 w. I & R—Feb., 1916. Operated under severe conditions, at Brenham, Texas.

Discussion on "Diesel Engines for Generator Drive," at San Francisco, Cal., Sept. 17, 1915 (67688 D). 3000 w. A I

Consult Classification of the Index. See page 7.

Diesel Plant

E E, Pro—Feb., 1916. Paper by Le-grand.

The Diesel Engine in America (68545 N). Max Rotter. Ills. 35 pp. Int Eng Cong, Trans—Paper 125. Also discussion. Designs and operation.

Performance of Diesel-Engine Plants in Texas (68713). R. H. Burdick. Ills. 2500 w. El W—March 11, 1916. Cost of installation; operating data.

The Present Position of the Marine Diesel Engine and Its Possibilities (70077 A). W. P. Sillince. Read before Inst. of Nav. Archts. 5500 w. Mch E—April 21, 1916. Deals particularly with "possibilities."

Diesel-Engine Operation at Palo Alto Municipal Plant (70008). 2000 w. Pwr—May 2, 1916. From city engineers' report giving results of year's operation.

Standard Fuel-Oil Engine (70256). Ills. 900 w. Pwr—May 9, 1916. Diesel engine of American design.

Diesel Engines for Marine Service (71479 A). G. C. Davison. Ills. 1800 w. M Rv—July, 1916. Factors that have promoted and retarded their application.

Diesel Engines (72396 N). F. Reginald Phipps, with discussion. Ills. 15 pp. I M C E, JI—July, 1916. Theoretical principles and practical points.

Diesel Engine Crankshafts (72529 A). Philip H. Smith. Ills. 2300 w. Mch E—July 28, 1916. How to prolong its life.

Starting Diesel Engines With Low Compression (78718 A). W. H. Watkinson. Read before the British Assn. Diagrams. 600 w. Eng—Sept. 22, 1916. Experiments in the possibility of working Diesel engines with low-compression pressures.

Diesel Plant

Operation of a Small Diesel Engine Plant (73070). Ills. 1200 w. El W—Sept. 9, 1916. Special construction and methods for a 200-kw. municipal lighting station.

See also MARINE AND NAVAL ENGINEERING.

Engines

A Novel Two-Stroke Engine (74075 A). J. A. Fish. Ills. 2000 w. S JI E—Oct., 1916. Type of internal-combustion engine. Details of design.

Engine Testing

Testing Aeroplane Motors with a Fan Dynamometer (69340). Lawrence Hodgson. 2000 w. Aut—April 6, 1916. Tests and analysis of results.

Engine Vibration

Inertia Disturbances and Torque Reactions in Multiple Cylinder Engines (71198). R. B. White. Diagrams. 2000 w. Wis E—May, 1916. Forces and mo-

COMBUSTION MOTORS**Gasoline Engines**

ments which tend to vibrational disturbances.

Exhaust Gases

The Composition of the Exhaust from Liquid-Fuel Engines (69167 N). Robert W. Fenning. 38 pp. I Mch E—March 17, 1916. Tests and results.

Farm Engines

Why Small Farm Engines Are Failures (10534 A). F. R. Parsons. 800 w. Enr—May 5, 1916. Required work; lack of adaptability; suggestions.

Fuels

Mixing Air and Furnace Gases (70814). S. H. Viall. Ills. 2500 w. Pwr—June 6, 1916. Analysis of seven tests showing effect of incomplete mixing.

Gas Combustion

The Combustion of Gas, and Flame Temperatures (71062 A). Frederick Peiter, with discussion. Ills. 5000 w. C E S, JI—May, 1916. Calculates flame temperatures of characteristic gases.

Gas Engine Plants

Gas Engines Replace a Steam Turbine Power Plant (65743). C. L. Follmer. Ills. 3000 w. Power—Nov. 16, 1915: Plant of the Monongahela Valley Traction Co., near Fairmont, W. Va.

Gas Engines

The Economical Production of Power from Coke-Oven Gas (71848 N). G. Dearle, with discussion. 9 pp. I E E, JI—June, 1916. Objections to gas-driven power plants; troubles, results, etc.

400 Brake Horse-Power Four-Cylinder Gas Engine (73019 A). Ills. & Plate. 2500 w. Enr—Aug. 18, 1916. Detailed description.

See Researches under *Heating and Cooling*.

See also Electrical Sets, under **ELECTRICAL ENGINEERING, Generating Stations**.

Gasoline

A Rational Basis for Motor Gasoline Specifications (66405 A). Paul W. Prutzman. Abstract of paper before Am. Petroleum Soc. 1200 w. W E—Dec., 1915. Summary of conditions to be satisfied.

Gasoline Engines

Effects of Varying Mixture and Ignition Timing (65911). Victor R. Gage. 800 w. Power—Nov. 23, 1915. Action of a gasoline engine with different fuel mixtures and different timing of the spark judged by comparing indicator diagrams.

The Balancing of Petrol-Motors (67936 A). Ills. 1000 w. Eng—Jan. 21, 1916. Editorial on the effect of the want of balance-weights.

Forced Induction (68618 A). Eric W. Walford. Ills. 3500 w. Aer—Feb. 19,

Consult Classification of the Index. See page 7.

Gas Power System

1916. Advantages of supplying gas under pressure.

Gas Power System

The Internal Combustion Engine of the Year 1915. The Gas Power System. A Survey of Its Status (68542 N). Charles Edward Lucke. Also discussion. 80 pp. Int Eng Cong, Trans—Paper 122. Reviews development.

Gas Producers

Wood-Gas Plants for Mines (65430 A). W. R. Degenhardt. Ills. 2000 w. Min Mag—Oct., 1915. Practice in Western Australia.

Gas Producers with By-product Recovery (66559 N). Arthur H. Lymn. Ills. 6000 w. A S M E—Dec., 1915. Historical résumé.

The Bituminous Coal Producer Plant: The Suction Plant (66324 A). E. M. Rose. Ills. 1500 w. Mch W—Nov. 26, 1915. Tests and results.

Gas Producers and Gaseous Fuels (67039 A). H. F. Smith. 22 pp. E C D—Nov., 1915. Discussion of status.

Discussion on Mr. Henry Mansfeldt Mills' Paper on "Gas Producers at Collieries for Obtaining Power and By-Products from Unsaleable Coal" (68173 N). Ills. 3500 w. I M E, Trans—Jan., 1916.

A Suction Gas Producer Using Bituminous Coal (68691 N). R. V. Farnham. Ills. 33 pp. I E S S, Trans—Feb., 1916. Design and working data.

A Suction Gas Producer Using Bituminous Coal (69732 N). 16 pp. I E S S, Trans—March, 1916. Discussion of R. V. Farnham's paper.

Sawmill Waste in Suction Producer Plant (69290). George S. Wilson. Ills. 1500 w. Pwr—April 4, 1916. Tests.

Gas Producer Control (70403). Reginald Trautschold. 1800 w. P E, C—May 15, 1916. Serial, 1st part. Thermostatic regulation.

A Suction Gas Producer Using Bituminous Coal (70278 N). 3000 w. I E S S, Trans—April, 1916. Farnham's reply to discussion.

Generator Gas

Ueber den Methangehalt im Generator-gas aus Koks (65407 B). F. Hoffmann. Ills. 2400 w. Glck—Oct. 2, 1915. Investigation of factors determining methane percentage in gas from coke-fired generators.

Humphrey Pump

See *Hydraulic Machinery*.

Ignition

Die Zündgeschwindigkeit brennbarer Gasmischungen (65474 B). Wilhelm Nusselt. Ills. 4500 w. Z V d I—Oct. 23,

COMBUSTION MOTORS**Power**

1915. Development of formulas for the velocity of ignition of gases.

Jacketing

Jackets for Gas and Oil Engines (68721). Reginald Trautschold. 2500 w. P E, C—March 15, 1916. Economical temperature range.

Nomenclature

The Nomenclature of Internal Combustion Engines (68348 A). 3500 w. Eng—Feb. 11, 1916. Review of question; suggestions.

Oil Engines

The Heavy Oil Engine, Its Present Status, and Future Development (65605 A). A. H. Goldingham. Ills. 4000 w. Am Soc Mech Engrs, Jour—Nov., 1915. Read at San Francisco. Both Diesel and hot surface types, with new cost data.

Development of Oil Engines (66192 A). 5500 w. A S M E JI—Dec., 1915. Discussion of papers by Adams and Goldingham.

Oil Engine Vaporizer Proportions (66564 N). Louis Illmer. Ills. 20 pp. A S M E—Dec., 1915. Research on hot bulbs and high-compression vaporizers.

Hot-bulb Crude-oil Engines (67410 A). E. M. Rose. Ills. 1200 w. Mch W—Jan. 7, 1916. Serial, 1st part. Designs and operation.

Oil Engines (68632 A). G. E. Windeler. Abstract of paper before Manchester Assn. of Engrs. Ills. 1500 w. Enr—Feb. 18, 1916. Particularly new design of Diesel.

General Electric Oil Engines for United States Government (70551). Alfred D. Blake. Ills. 2500 w. Pwr—May 23, 1916. Novel features.

The Future of the Marine Oil Engine (70773 A). John F. Wentworth. Ills. 2200 w. M Rv—June, 1916. Hints to aid in the selection of type.

Heavy-Oil Engines (73749 A). S. B. Daugherty. Ills. 5000 w. A S M E JI—Oct., 1916. Question of availability of fuel, with observations on oil engines.

See also Combined Plant, under *Combustion Motors*.

See also *MARINE AND NAVAL ENGINEERING*.

Power

Margin of Power in Internal Combustion Engines (71167). R. E. Mathot. 1800 w. Pwr—June 20, 1916. Factors affecting the capacity.

Power from Coke Oven Gas (70749 A). G. Dearle. From paper before I. E. E., Yorkshire Br. 4500 w. C G—May 12, 1916. Reviews an installation at a modern gas-driven electric station.

Consult Classification of the Index. See page 7.

Power Plants

HEATING AND COOLING

Churches

Power Plants

An Investigation of the Gas-Producer Power Plants in New York City and Vicinity (66189 A). C. M. Ripley. Also discussion. 10000 w. A S M E JI—Dec., 1915. Size, age, performance, costs.

Sommerfeld Gas-Engine Plant (66640). W. O. Rogers. Ills. 1000 w. Pwr—Dec. 21, 1915. In Pittsburgh.

Producer Gas

Koks für Gaserzeuger (67769 B). H. Markgraf. Ills. 4500 w. St u E—Jan. 20, 1916. Application of coke to making producer gas.

Semi-Diesel Engines

The Petter Semi-Diesel Engine (69329 A). Ills. 1000 w. Enr—March 17, 1916.

What Is a Semi-Diesel Engine? (70404). C. S. Salfeld. Ills. 2000 w. P E, C—May 15, 1916. Construction; characteristic features.

Waste Heat

Ueber die Verwertung der Abwärme von Verbrennungsmaschinen in Turbinen (66258 B). Wilhelm Gentsch. Ills. 2000 w. Z g T—Nov. 30. Serial, 1st part. How turbines may utilize waste heat from combustion engines.

HEATING AND COOLING

Air Conditioning

Air Conditioning in a Gas Mantle Plant (71794). Ills. 2000 w. H & V M—July, 1916. Equipment of plant at Camden, N. J.

Air Washing

Washing and Cooling Air for Steam Turbine Generators (71797). Ills. 1000 w. H & V M—July, 1916. Importance of cleanliness and proper ventilation.

Ammonia

Effect of Superheated Ammonia on Compressor Capacity (65612). H. R. Howell. 1800 w. Power—Nov. 9, 1915. Importance of temperature.

Decomposition of Ammonia and the Chances of Explosions (65909). Frank L. Fairbanks. 2500 w. Power—Nov. 23, 1915. Experiments in a large refrigerating plant fail to produce an explosion of ammonia gas by detonation.

Equations for Ammonia Based on New Experimental Material (68851 N). Frederick G. Keyes. Ills. 20 pp. A S R E JI—Jan., 1916. Physics of phenomena; with discussion.

Aeration Method for Ammonia (73813 B). B. S. Davisson, E. R. Allen, and B. M. Stubblefield. 3500 w. JI I & E C—Oct., 1916. Experimental work.

The Flow of Superheated Ammonia Gas in Pipes (73882 B). Edward F. Miller. Curves. 600 w. A I R E, JI—Sept., 1916. Data from tests.

Ammonia Compressors

Indicating the Ammonia Compressor (69861). Ills. 2000 w. Pwr—April 25, 1916. Serial, 1st part. Using adiabatic curve to compare diagrams.

Troubles and Care of Ammonia Compressor Valves (70253). A. G. Solomon. 1800 w. Pwr—May 9, 1916. Serial, 1st part. Construction, operation, care.

Bernoulli's Principle

The Principle of Bernoulli and its Relation to Heating and Ventilating of a

Building (68158). S. R. Williams. Ills. 1200 w. H & V M—Feb., 1916. Illustrates by examples.

Boilers

Boiler Efficiency as Related to Ice Plants (68587 A). John E. Starr. 3500 w. I & R.—March, 1916.

Calcium

Calcium (67197 A). J. D. Burby. Read at W. Ice Mfr. Con. 3000 w. I & R—Jan., 1916. Process and cost of manufacturing calcium in refrigerating plants.

Car Heating

Passenger Car Steam Heating Plant at Atlantic City, N. J. (70411). Charles A. Bingham. Ills. 2000 w. H & V M—May, 1916. Problem and solution.

Central Plants

Central Heating Plants (65399). Charles L. Hubbard. 2500 w. Nat'l Engr—Nov., 1915. Methods of estimating cost of operation and maintenance.

Central-Station Heating

Central Station Heating in Wadena, Minn. (70413). L. A. Larsen. 500 w. H & V M—May, 1916. Data on small plant earning 12.8 per cent per annum.

Central Stations

Central-Station Heating Plant Operation in Milwaukee (72089). O. M. Rau. Ills. 2500 w. El W—July 29, 1916. Electrical energy produced as by-product of heating plant.

Central Station Steam Heating by Miles City, Montana, Municipal Plant (71595 A). G. C. Pruett. 3000 w. Mun E—July, 1916. Successful plant.

Central Station Heating the Method of the Future (72625). Arthur Williams. From address before Nat. Dist. Heat. Assn. 2500 w. H & V M—Aug., 1916.

Churches

The Heating and Ventilating of Churches (66819 B). Harold L. Alt. Ills. 3500 w. Bkbl—Dec., 1915. Practical systems and their installation.

Consult Classification of the Index. See page 7.

Cold Storage

Cold Storage

Sydney Cold Storage Works (70226 A). W. J. Williams. Ills. 1500 w. I & R—May, 1916. Municipal works in Australia; rates and regulations.

Combination Plants

A Large Combination Steam and Forced Hot Water Heating Plant (66510). Ills. 1500 w. H & V M—Dec., 1915. N. Y. State Reformatory for Women, Bedford Hills, N. Y.

Problem in Combined Power and Heating (70771). Charles L. Hubbard. Ills. 3500 w. N E—June, 1916. Method of estimating approximate results under given conditions.

See ELECTRICAL ENGINEERING, *Generating Stations*.

See also Power Plants, under STEAM ENGINEERING.

Conservatory

Heating a Conservatory and Greenhouse (73327). J. D. Hoffman. Ills. 700 w. H & V M—Sept., 1916. Unusual conditions. Successful service.

Creamery Refrigeration

Facts About Creamery Refrigeration (68588 A). J. H. Speed. 900 w. I & R—March, 1916. Relative advantages of ice cooling and mechanical refrigeration.

District Heating

District Heating System at Whitby, Ont. (65881). J. Lanning. Ills. 1500 w. Can Engr—Nov. 18, 1915. Heating and ventilating system for the Hospital for the Insane.

Distribution System

Cost of Removing and Replacing Pavements Incident to the Installing of Heating Lines in City Streets (67368 D). W. F. Verner. 700 w. A S H V E JI—Jan., 1916. Tabulated results of a study.

Ducts and Flues

Comparison of Various Methods of Figuring Duct and Flue Sizes (73981). Harold L. Alt. Ills. 2500 w. H & V M—Oct., 1916. Standard practice in six engineering offices.

Economics

L'Economia nel riscaldamento (72111). C. A. Gullino. Diagrams. 2800 w. M T—June 10, 1916. Necessity for heating, basic theories of the science of heating.

Electric Heating

Electric Heating of a Canadian Residence (69133). Ills. 2000 w. El R & W E—March 25, 1916. Equipment used.

Experience with Electric Heating of Dwellings (72709). J. D. Ross. Ills. 2500 w. El W—Aug. 26, 1916. System tried at Seattle.

See Heating under ELECTRICAL ENGINEERING, *Power Applications*.

HEATING AND COOLING

Heat Transmission

Equitable Building

Heating and Ventilating Plant, Equitable Building (67364 D). W. H. Driscoll. Ills. 2000 w. A S H V E JI—Jan., 1916. Detailed description.

Exhaust Steam

Exhaust Steam—Its Value for Process Heating in Textile Mills (71482). Theodore N. Kelsey. 2200 w. N E—July, 1916. Large gains.

Factory Heating

See same heading under INDUSTRIAL MANAGEMENT, *Management*.

Filtration

The Filtration and Softening of Water (67198 A). T. G. Windes, Jr. Read before the W. Ice Mfrs. Con. 2500 w. I & R—Jan., 1916. Methods, purification, water-softening systems.

Furnaces

Some Elements of Smokeless Furnace Design (67353). Osborn Monnett. Ills. 2200 w. H & V M—Jan., 1916. Settings may be improved.

Gas Heating

Gas House Heating (67547 A). Ills. 10000 w. C E S JI—Jan. 1916. Records of actual consumption of natural gas in some 47 homes or apartments. General discussion.

Heating

The Selection of a Heating System (67691 B). Charles L. Hubbard. 4500 w. Bkbl—Jan. 1916. Comparisons.

Heating Coils

Notes on the Use of Heating Coils (66508). T. W. Reynolds. 2000 w. H & V M—Dec., 1915. Examples of proper and improper design.

Heat Loss

Heat Loss Calculations (68118 B). R. W. Noland, with discussion. 4000 w. Ind Eng Soc—1915. Unreliability of methods.

Report of the Establishment of a Standard Coefficient for Heat Losses Affected by Wind Movement (65760 D). H. W. Whitten and R. C. March. 700 w. Am Soc Heat & Vent Engrs, Jour—Oct., 1915. Part of a report read at the Chicago Convention, June, 1915.

Heat Transmission

See Researches.

Effect of Velocity and Humidity of Air on Heat Transmission through Building Materials (68159). J. A. Moyer. Ills. 2500 w. H & V M—Feb., 1916. Read before Am. Soc. of Refrig. Engrs. Report of tests.

Effect of Velocity and Humidity of Air on Heat Transmission Through Building Materials (72144 B). J. A. Moyer, with discussion. (Abstract.) 8 pp. A S R E

Consult Classification of the Index. See page 7.

Hot Air Furnaces

HEATING AND COOLING

Institution Plants

—July, 1916. Discussion of tests made at Penn. State College.

Heat Transmission Through Building Materials (72628). John R. Allen. Ills. 1500 w. H & V M—Aug., 1916. Tests that show a higher average heat loss through glass.

Hot-Air Furnaces

Heat Analysis of a Hot-Air Furnace (67361 D). John R. Allen. Ills. 2000 w. A S H V E JI—Jan., 1916. Tests.

Hot-Water Heating

Hot Water Heating Systems (65897). George E. Reid. Diagrams. Lecture before N. A. S. E., Washington, D. C. 3000 w. Nat'l Engr—Nov., 1915. Philosophy of circulation.

Hot Water Heating on a Large Scale (65809). Ills. 2200 w. Heat & Vent Mag—Nov., 1915. Central heating plant for the state school of agriculture, Farmingdale, L. I.

Heating by Forced Circulation of Hot Water in Textile Mills (66577 N). Albert Greene Duncan. Ills. 20 pp. A S M E—Dec., 1915. Heating by exhaust steam.

Hot Water Heating (68429). Edward H. Kearney. 4000 w. N E—March, 1916. Principles.

New Empirical Formulæ for Hot Water Heating, with Pipe Sizes for Two-Pipe Systems (69044). Jay H. Keller. 1000 w. H & V M—March, 1916. Tables and explanations.

Hot Water Heating for a Railroad Station in a Cold Climate (72626). Ills. 1000 w. H & V M—Aug., 1916. Installed at Pocatello, Idaho.

Hot-Water Heating at Plant of the Crane Co., Chicago (73121). Thomas Wilson. Ills. 2000 w. Pwr—Sept. 12, 1916. Serial, 1st part. Modern system of seven circuits to care for 600,000 sq. ft. of radiation in 49 buildings.

A Successful Hot Water Heating System (73628). J. C. Hawkins. Ills. 2000 w. P E, C—Oct. 1, 1916. Scheme for heating office building.

Hot Water Heating Systems (71485). William Schultheis. 1000 w. N E—July, 1916. Tables and calculations.

Humidity

The Theory of Humidity (68203 A). C. Harold Berry. 3500 w. S JI E—Feb., 1916. Attempt to formulate consistent theory.

Humidity and Automatic Control, with Comparisons of Different Arrangements of Heaters and Reheaters and Their Effects (71796). Harold L. Alt. Ills. 2500 w. H & V M—July, 1916. Methods.

Ice

Experimental Studies and Observations on Ice Structure (65652 B). O. D. von Engeln. Ills. 7500 w. Am Jour of Sci—Nov., 1915. Experiments and results.

Specific Heat and Heat of Fusion of Ice (65968 N). H. C. Dickinson and N. S. Osborne. Ills. 33 pp. U S Bureau of Stand—Oct. 28, 1915. Determination of constants of importance in the design and operation of refrigerating machinery.

Storage of Ice (68585 A). George M. Hayes. 1700 w. I & R—March, 1916. Proper stacking.

Practical Points on Raw Water Ice (72188). A. G. Solomon. 2500 w. P E, C—Aug. 1, 1916. Serial, 1st part. Advantages; machinery; operating hints.

Ice Making

Raw Water Ice (66199 A). H. D. Pownall. Ills. 3300 w. I & R—Dec., 1915. Systems in use, particularly Arctic-Pownall.

Latest Developments of Fresh Water Ice (67199 A). C. G. Osborne. Ills. 3000 w. I & R—Jan., 1916. Four systems considered; characteristics, advantages and field of each.

The Manufacture of Ice by the Raw Water Process (67196 A). George B. Bright. Read at W. Ice Mfrs. Con. 3000 w. I & R—Jan., 1916. Cost, design, operation, etc.

Making Ice with Purchased Electric Power (68120 B). Charles A. Tripp, with discussion. Ills. 3000 w. Ind Eng Soc—1915. Plant of Irvington Ice Co.

Raw Water Ice Making Plant at St. Paul (67826 A). Ills. 1500 w. I & R—Feb., 1916. Plant, equipment, test.

Ice Plants

Management and Operation of Ice Plants (66195 A). Charles F. Rantz. 2500 w. I & R—Dec., 1915. Suggestions for economy.

The Direct Connected Oil Engine Driven Ice Mfg. Plant (66198 A). William T. Price. Ills. 3000 w. I & R—Dec., 1915. Advantages, types, etc.

The High Compression Oil Engine for Ice Manufacturing (66196 A). Hollis Paine Porter. 1800 w. I & R—Dec., 1915. Designs, economy, cost.

A New 100-Ton Raw Water Ice Plant (72266 A). Ills. 2000 w. I & R—Aug., 1916. Plant and equipment in Chicago.

The Needles Ice Plant and Car Icing Station (72985 A). Thomas M. Gaffney. Ills. 5500 w. I & R—Sept., 1916. Oil engine driven plant at Needles, Calif.

Institution Plants

Design of a Power Plant for an Institution (69219). Charles L. Hubbard.

Consult Classification of the Index. See page 7.

Insulation

Ills. 2200 w. N E—April, 1916. Serial, 1st part. Essential steps and details to be considered.

Heating and Ventilating Plants for Large Public Institutions (68432). Charles L. Hubbard. Ills. 2000 w. N E—March, 1916. Special requirements.

Insulation

Insulation Against Heat, Cold and Sound (69138 A). C. B. Rowley. 7000 w. C E S, JI—March, 1916. Theory and materials.

Insulation (72479). Ills. 1500 w. P E, C—Aug. 15, 1916. Importance of coverings for steam, brine and ammonia pipes.

Laboratories

A Notable Institution for the Advancement of the Heating and Ventilating Art (67359 A). Arthur K. Ohmes. Ills. 2500 w. A S H V E JI—Jan., 1916. Testing Institute for Heating and Ventilation appliances at Berlin University; equipment and plant.

A Laboratory for Research on Heating and Ventilation (68257 A). Ills. 1800 w. El R—Feb. 4, 1916. Prof. A. H. Barker's laboratory, England.

Laws

Requirements for Model Compulsory Heating and Ventilating Laws (69486). 8000 w. H & V M—April, 1916. For public and semi-public buildings.

Light and Heat

Modern Systems of Independent Lighting and Heating (67355 A). Ills. 1800 w. Nt—Jan. 6, 1916. Oil, oil gas, and petrol-air gas systems.

Light and Refrigeration

Elektrizitätswerk, Eisfabrik, Kühl- und Gefrierhaus (65420 B). Richard Pabst. Ills. 3000 w. E K u B—Oct. 14, 1915. Advantages of combining lighting plant with refrigeration, with Berlin example.

Neutral Zone

Can We Locate the Neutral Zone in Heated Buildings? (65811). J. J. Blackmore. Ills. 2500 w. Read at Atlantic City meeting of Am. Soc. of Heat. & Vent. Engrs. Heat & Vent Mag—Nov., 1915. Physical facts involved; examples.

Office Buildings

Heating a Chicago Office Building (67366 D). S. Morgan Bushnell. Ills. 2500 w. A S H V E JI—Jan. 1916. Relation between theoretical calculations and actual results.

Oil Heating

Petroleumheizung und Rohölf Feuerungsanlagen (67728 B). Martin Siebert. Ills. 3000 w. G-I—Jan. 1, 1916. Details of installations of petroleum-fired furnaces.

HEATING AND COOLING**Radiation****Operating Cost**

The Cost of Operating Heating Plants (67367 D). George W. Martin. 2500 w. A S H V E JI—Jan., 1916. Records of plants in New York covering last five years.

Report of Committee on Cost of Operation of Heating and Ventilating and Power Plants in Hospitals (69949 D). 1000 w. A S H V E, JI—April, 1916. With discussion.

Report of Committee on Operating Costs of Public Buildings (69948 D). 600 w. A S H V E, JI—April, 1916. Tables and discussion.

Overhauling

Overhauling (70227 A). George J. Troster. 1200 w. I & R—May, 1916. Serial, 1st part. Equipment, repairs and improvements; results.

Pipe Lines

Engineering and Cost Data Relative to the Installation of Steam Distributing Systems in a Large City (69944 D). F. H. Valentine. 1200 w. A S H V E, JI—April, 1916. Serial, 1st part. General practice.

Pipe Supports

Pipe Hangers (69043). Harold L. Alt. Ills. 1500 w. H & V M—March, 1916. Serial, 1st part. Types.

Piping

Wahl des Rohrleitungssystem bei Schwerkraft-Warmwasserheizungen (68311 B). Ernst Bleiber and Albert Tichelmann. Ills. 12000 w. G-I—Jan. 29, 1916. Discussion of previous paper on design of piping system for high-pressure hot-water heating.

Piping Chart

New Pipe Chart and Tables Based on Square Feet of Radiation (65810). T. W. Reynolds. 1000 w. Heat & Vent Mag—Nov., 1915. For use in determining sizes of mains and branches for low-pressure steam-heating systems.

Progress

Progress of Heating and Ventilating Art in the Last Decade (65694 A). Rolla C. Carpenter. Read before Int. Engng. Cong. 2800 w. Sib Jour of Engng—Nov., 1915. General character of improvements.

Publicity

Report of Committee on Education and Publicity (69950 D). 28 pp. A S H V E, JI—April, 1916.

Radiation

New Radiation Coefficients (66509). 1200 w. H & V M—Dec., 1915. Based on tests by heating department of University of London.

Radiators

Present Status of the Determination of the Constant of Total Radiation from a Black Body (68733 N). W. W. Coblentz. 30 pp. U S B S, Sci paper No. 262—Feb. 25, 1916.

Constants of Spectral Radiation of a Uniformly Heated Inclosure or So-called Black Body, II (72099). W. W. Coblentz. 18 pp. U S B S, Sci paper No. 284—July 8, 1916. Gives a re-computation of two "constants."

Radiators

Determination of Radiator Sizes for Hot Water Heating Plants (67354 A). Freywid Wegelius. 600 w. H & V M—Jan., 1916. Based on rule applying to series of temperatures.

Recirculation

Tests on the Recirculation of Washed Air (65759 D). G. L. Larson. Ills. 8500 w. Am Soc Heat & Vent Engrs, Jour—Oct., 1915. Tests of system in University of Wisconsin High School.

Refrigerating Plants

An Efficient and Sanitary Refrigerating Plant (69217). Ills. 800 w. N E—April, 1916. Milk station.

Refrigeration

Overhauling the Refrigerating Plant (65351). A. G. Solomon. Ills. 1800 w. Prac Engr, Chicago—Nov. 1, 1915. Hints to avoid unnecessary labor and expense.

Vapor - Compression Refrigeration (65806 N). J. H. Grindley. Plates. 38 pp. Inst Civ Engrs of Ireland, Trans—Vol. XLI. Part I describes vapor-compression refrigerating machines and the theory of their action. Part II gives new diagrams for the properties of CO₂ and NH₃.

Foreign Gases and Solids in the Absorption Plant (66799). H. G. Gibson. 1000 w. Pwr—Dec. 28, 1915. How air and gases from decomposed ammonia show their presence.

Ammonia in Absorption Ice Machines (66197 A). Dr. F. W. Frerichs. 2000 w. I & R—Dec., 1915. Suggestions for successful operation.

Steam-Jet Refrigeration (67216). J. C. Bertsch. Ills. 1600 w. Pwr—Jan. 11, 1916. From paper before Am. Warehouse Assn. Westinghouse-Leblanc system.

Packing for Ammonia-Compressor Stuffing-Boxes (67918). F. L. Fairbanks. Ills. 1800 w. Pwr.—Feb. 8, 1916.

Theory of Refrigeration (68586 A). Eric H. Peterson. Charts and tables. 1800 w. I & R—March, 1916. Serial, 1st part. Data shown by log sheets.

Symptoms of Troubles in the Refrigeration Plant (68739). Thomas G. Thurston. 1800 w. Pwr—March 14, 1916.

HEATING AND COOLING**Refrigeration**

Sub-Railroad Cold Storage (68718). Ills. 1500 w. P E, C—March 15, 1916. Warehouse under terminal tracks.

Refrigeration Problem in Russia (70228 A). Dr. L. Edgar de Cramm. 2000 w. I & R—May, 1916. Present state of artificial refrigeration.

Brine-Coil Defrosting System (69975). Ills. 1000 w. P E, C—May 1, 1916. Successful system.

Ammonia Condenser Data (71192 B). Henry Torrance. Ills. Also discussion. 6000 w. A S R E, JI—May, 1916. Experimental results.

Brine Circulating System (70662). A. G. Solomon. Ills. 3000 w. P E, C—June 1, 1916. Comparison with direct expansion system. Care and arrangement.

Frozen Beef for Europe (70774 A). Ills. 3500 w. M Rv—June, 1916. Details of S. S. Procida, fitted with carbonic acid refrigeration.

Multiple-Effect Compression Refrigerating Machines (71022 A). Wilfrid Stokes. Ills. 1800 w. Mch W—June 2, 1916. Serial, 1st part. Advantages.

Operating the Carbon-Dioxide Refrigerating Machine (71411). F. T. Fleniken. Ills. 2000 w. Pwr—June 27, 1916.

Pumping Out an Ammonia System (71489). Thomas G. Thurston. Ills. 3000 w. P E, C—July 1, 1916. Directions and precautions.

Refrigeration (71594 A). Articles by George J. Trosper, and by G. H. Crawford. 3000 w. I & R—July, 1916. Theory and practice of mechanical refrigeration, based on Mr. Peterson's articles.

A Suggestion to Prevent the Loss of Ammonia at Stuffing Boxes (72145 B). Louis Block, with discussion. Ills. 1000 w. A S R E—July, 1916. A compressor without a stuffing box.

Energy Generation in the Packing Industry (71804). Ills. 2500 w. P E, C—July 15, 1916. Refrigerating equipment and boiler control in a Chicago plant.

The Liquid Seal (71593 A). Peter Neff. 1300 w. I & R—July, 1916. Value and importance in ammonia receivers.

A New Departure in Ammonia Compression (72469). Charles H. Bromley. Ills. 2200 w. Pwr—Aug. 15, 1916. Interesting details.

Power Plant of Armour Company (72178). Thomas G. Thurston. Ills. 3500 w. N E—Aug., 1916. Largest refrigerating plant under one roof, located in Chicago.

Testing Refrigerating Plants (73286). Julian C. Smallwood. 2000 w. Pwr—

Research

Sept. 19, 1916. Essentials in testing an ammonia compression plant.

Design, Construction and Operation of a Thousand-Ton Ammonia Compression Refrigerating Machine (73883 B). F. L. Fairbanks. (Abstract). Ills. and discussion. 18 pp. A S R I, JI.—Sept., 1916. Installation in Boston.

Testing Absorption Plants (73803). Julian C. Smallwood. 2000 w. Pwr—Oct. 10, 1916. Methods of determining steam and ammonia quantities, horsepower of pump, etc.

Research

Research Work for the Operating Engineer — Heating Problems (73457). Charles L. Hubbard. 3500 w. Pwr—Sept. 26, 1916. Suggestions for systematic work for benefit of science.

Notes on Some Recent Researches (65747 N). J. E. Petovel. Ills. 50 pp. Manchester Assn. of Engrs—Oct. 30, 1915. Part I. Heat transmission. Part II. Heat flow and ventilation. Part III. Gas engine research. Part IV. Strength of structures.

Schools

Heating and Ventilating Plant, Waite High School, Toledo, Ohio (65758 D). Samuel R. Lewis. Ills. 1800 w. Am Soc Heat & Vent Engrs, Jour—Oct., 1915. Equipment of this plant.

The School Power Plant (69896 B). Harold L. Alt. Ills. 2500 w. Bkbl—April, 1916. Practical examples in various localities.

Power Plant of a Model School (65395). R. J. Mullin. Ills. 3500 w. Natl Engr—Nov., 1915. High school at Tacoma, Wash. Interesting details. Oil fuel system.

New York School Heating Practice, with Special Reference to New York City Public School Buildings (73326). Frank G. McCann. Ills. 4000 w. H & V M—Sept., 1916. Details of present methods.

Skating Rink

Duquesne Garden Ice Skating Rink (70833 A). Ills. 1800 w. I & R—June 1, 1916. Large artificial ice rink in Pittsburgh.

Steam Heating

Co-operation With the Consumer (71111). William J. Baldwin. 3000 w. H & V M—June, 1916. With suggestions.

Thermal Insulators

The Testing of Thermal Insulators (73881 B). H. C. Dickinson and M. S. Van Dusen. Ills. 20 pp. A S R E, JI—Sept., 1916. Progress report, with appendix and discussion.

Thermodynamics

Flow of Heat from Solids to Air (70824 N). E. E. Snyder, C. S. Robin-

HEATING AND COOLING

Ventilation

son, and W. K. Lewis. 1000 w. J I & E C—June, 1916. Investigation.

Vacuum Heating

Atmospheric, Vacuo-Vapor and Vacuum Heating Systems (67322). James D. Hoffman. Ills. 1300 w. Pwr—Jan. 18, 1916. Compares relative advantages.

Vacuum Heating Systems (73679). Charles L. Hubbard. 1500 w. Pwr—Oct. 3, 1916. Details of three systems in present use.

Ventilation

Development in Mechanical Ventilation Hygienically, Above Ground, Under Ground, and Under Deck (65929 A). James Keith. Ills. From a paper read before the Inst. of Marine Engrs. 1800 w. Col Guard—Nov. 5, 1915. Design of ventilating systems.

Ozone for Ventilation (66463). Ills. 2500 w. M & C E—Dec. 15, 1915. Report of test of Westinghouse air ozonizer, with experiments by Sheppard T. Powell.

Can We Standardize the Requirements for Ventilation? (67362 D). J. J. Blackmore. 5500 w. A S H V E JI—Jan., 1916. Study of factors.

The Ventilation of Living Quarters (67363 D). Ills. 3000 w. A S H V E JI—Jan., 1916. Chicago commission on ventilation.

The Ventilation of Special Rooms (69087 B). Charles L. Hubbard. Ills. 3000 w. Bkbl—March, 1916.

Report of Committee on Minimum Ventilation Requirements for Public and Semi-Public Buildings for Legislation Purposes (69951 D). 23 pp. A S H V E, JI—April, 1916.

Ventilation Requirements and Test Methods (69765 B). E. V. Hill, with discussion. Ills. 25 pp. W S E, JI—Feb., 1916. Good practice and methods.

An Outline of the Activities of the New York State Commission on Ventilation for the Year 1915 (69947 D). George T. Palmer. Ills. Also discussion. 4000 w. A S H V E, JI—April, 1916.

Indirect Heating and Ventilation (69221). Edward H. Kearny. 5000 w. N E—April, 1916. Various systems.

Test of Air Conditions in an Illinois School (70412). E V Hill. Ills. 2500 w. H & V M—May, 1916. School test; suggestions for making and for recording results.

Natural Ventilation in the Federal Hill School (71110). Harold L. Alt. Ills. 1100 w. H & V M—June, 1916. Unusual combination.

Chart for Figuring Round and Rectangular Ventilating Ducts (72627). Charles A. Fuller. 800 w. H & V M—Aug., 1916. Chart and its use.

Consult Classification of the Index. See page 7.

Warehouses

Ventilation in India (72579 A). 2800 w. Enr—Aug. 4, 1916. Conditions and Customs.

See also Factory Ventilation, under INDUSTRIAL MANAGEMENT, *Management*.

Warehouses

Operation of Warehouse Heating Plant of Merck & Co. Rahway, N. J. (67365 D). J. F. Cyphers. 2500 w. A S H V E JI—Jan., 1916. Details of building, plant, and its operation.

HYDRAULIC MACHINERY**Pumping Plants****Water Purification**

Purification of Water for Ice Plants (69310 A). Walter H. Green. 2000 w. I & R—April, 1916. Relation of filtration and softening to impurities.

Windows

Window Leakage (67360 D). Stephen F. Voorhees and Henry C. Meyer, Jr. Ills. 2000 w. A S H V E JI—Jan., 1916. Tests on metal-frame types, and methods of reducing.

HYDRAULIC MACHINERY**Air Lift**

Lifting Ground Water by Compressed Air (67475). W. L. Saunders. Read at second Pan-Am. Cong. Ills. 3500 w. C A M—Jan., 1916. Present condition of art; Pohle and Saunders system.

Air-Lift Pumps (71625 A). Ills. 4500 w. E Rv—June 15, 1916. Equipment, principle of working, operation, etc.

The Quebec Bridge Pumping Plant. (65999). J. W. Davis. Ills. 1500 w. Can Engr—Nov. 25, 1915. Details of air lift system with booster.

Air Lift Pumps and Compressor Capacities (68281 A). J. D. Campbell. 500 w. Mch W—Feb. 11, 1916. Formula which takes the "submergence" into account.

The Air Lift (69068 N). Arthur H. Ford. Ills. 1200 w. A W A, JI—March, 1916. Explanation of operation.

Air-Pumps

Condensers and Willans-Müller Air-Pumps (65931 A). Ills. & Plate. 2500 w. Engng—Nov. 12, 1915. Detailed description.

Centrifugal Pumps

How Low Fixed Charges Favor Centrifugal Pumps (65541). G. H. Gibson. Ills. 1800 w. Eng News—Nov. 4, 1915. Comparison of economic results.

Shop and Acceptance Tests of 30,000,-000-Gal. Pump (66429). Ills. 2000 w. Pwr—Dec. 14, 1915. Two tests of turbine-driven centrifugal pump.

The Selection, Installation, and Test of a 1,000,000 Gallon Motor Driven Centrifugal Pump (70586 N). S. R. Blake-man. Ills. 24 pp. A W W A, JI—June, 1916. Plant at Dyersburg, Tenn.

Chemi-Hydrometry

See Flow under CIVIL ENGINEERING, *Measurement*.

Discharge Accelerator

Unique Hydraulic Power Plant at the Henry Ford Farms (66558 N). Mark A. Replogle. Ills. 2200 w. A S M E—Dec., 1915. Compensation for high water.

Erosion

See same heading, under CIVIL ENGINEERING, *Waterways and Harbors*.

Fire Pumps

Electrically Driven Fire Pumps (69175 A). 2000 w. Sf E—March, 1916. Factors affecting reliability.

Flumes

Hydraulic Principles of Flume Intakes and Outlets (73384). A. C. Norton. Ills. 1300 w. E N—Sept. 21, 1916.

Humphrey Pump

The Humphrey Pump: Recent Developments (65695 A). Charles C. Trump. Ills. 2000 w. Sib Jour of Engng—Nov., 1915. Improvements; ignition problems.

The Solid Piston Humphrey Pump (70346 A). Ills. 2000 w. Enr—April 28, 1916. Details of new design, operation, tests.

Hydraulic Presses

The Design of Hydraulic Presses (69993 A). Hugo Friedmann. Ills. 2500 w. Mch—May, 1916.

Marine Pumps

See Pumps under MARINE AND NAVAL ENGINEERING.

Oil-Engine Pumps

See Pumping under CIVIL ENGINEERING, *Water Supply*.

Pumping Plants

High-Pressure Centrifugal Pumping Plant at Edmonton, Canada (69320 A). Ills. 2500 w. Eng—March 17, 1916. Detailed description.

A Salt-Water Pumping Plant (70553). Ills. 1200 w. Pwr—May 23, 1916. Station of Standard Oil Co., El Segundo refinery.

Deep-Well Pumping Plant at the Leathersellers' Hall (73021 A). Ills. 1500 w. Enr—Aug. 18, 1916. Details of an installation of deep-well pumps, driven by electric motors.

North Memphis Pumping Station (73456). T. M. Heermans. Ills. 1500 w. Pwr—Sept. 26, 1916. Details of equipment.

Consult Classification of the Index. See page 7.

Pumping Units

HYDRAULIC MACHINERY

Water Power

Pumping Units

Pointers for Comparing Types of Pumping Units (66829). George M. Peek. 1200 w. E N—Dec. 30, 1915. Comparison of two St. Louis pumps.

Pumps

Types of Pumps, Condensers and Cooling Systems (66926). Ills. 105 pp. P E, C—Jan. 1, 1916. Detailed descriptions and general information.

Modern Pump Ancestors (69981). Ills. 1500 w. N E—May, 1916. Early types in Egypt, India, and China.

Use of Oil Engines for Pumping (72874). C. R. Knowles. 2200 w. N E—Sept., 1916. Tests with distillates, kerosene, and gasoline.

Pump Test

Difficult Pump Test Made with Pitot Tube (71614). C. E. Grunsky. Ills. 3100 w. E N—July 6, 1916.

Screw Pumps

Huge New Orleans Screw Pump Shows 80% Efficiency (67264). W. H. P. Creighton and George G. Earl. Ills. 4200 w. E N—Jan. 13, 1916. Two articles on recent tests of drainage pumps of novel design.

Mammoth Screw Pumps of New Design Develop High Efficiencies for Low Lifts (67177). Ills. 2500 w. E R—Jan. 8, 1916.

Turbines

Fortschritte im Bau der Wasserturbinen (65490 B). W. Wagenbach. Ills. 3000 w. Z V d I—Nov. 6, 1915. Serial, 1st part. Review of progress in construction of water turbines especially as exhibited at the 1914 Berne exposition.

Further Means Suggested for Interpretation of Water-Turbine Test Data (65336). L. F. Harza. Ills. 2800 w. Eng Rec—Oct. 30, 1915. Five new features to help visualize turbine characteristics.

Neueste Typen schnellaufender Wasserturbinen (65465 B). W. Zuppinger. Ills. 3000 w. Schw Bau—Oct. 23, 1915. Serial, 1st part. Design of recent Swiss types of high-speed turbines.

Design of Turbine Draft Tubes Analyzed (65725). 3500 w. Eng Rec—Nov. 13, 1915. Serial, 1st part. New formula derived for reduction of velocity of water leaving turbine.

Die Anwendung grosser Stützkugellager für vertikalachsige Wasserturbinen in der Schweiz. (65480 B). Max F. C. Schoch. Ills. 2000 w. Schw Bau—Oct. 30, 1915. Swiss use of ball bearings for supporting thrust of vertical water turbines.

Bremsversuche an einer neuer schnellaufenden Wasserturbine von Escher Wyss & Cie (67010 B). F. Prasil. Ills. 2200 w. S B—Dec. 18, 1915. Serial, 1st part. Results of brake test on Escher Wyss high-speed water turbine.

Tests of 18000 Hp. Tallulah Falls Turbines (68371). E. Lauchli. Ills. 1000 w. E N—Feb. 24, 1916. Efficiency tests.

Determination de la surface rationelle des aubes d'une turbine hydraulique (68837 B). J. Dejust. Ills. 2000 w. Gn Cv—Feb. 26, 1916. Method for designing surface of turbine blades.

Diagram for Full Comparison of Hydraulic Turbines (70623). Robert E. Horton and Walter C. Pomeroy. Ills. 4200 w. E N—May 25, 1916. New form of efficiency-contour diagram.

Améliorations diverses du rendement des turbines dans les usines à chute faible et variable (71327 B). A. Goupil. Ills. 3000 w. Gn Cv—May 27, 1916. Recent improvements in turbine efficiency under low and variable heads.

High Turbine Economy at Poor Load Factors (71662). Ills. 1200 w. El W—July 8, 1916. Advantages from use of double-nozzle gear-type turbines in two small generating plants.

Mezzi Per Migliorare Il Rendimento Delle Turbine Negli Impianti A Caduta Piccola (73517 B). Ills. 2000 w. Ind—Aug. 27, 1916. Methods for improving the output of turbines in plants with low or variable head.

Modo d'Eliminare la Sabbia Ed Il Fango Dalle Acque d'Alimentazione Delle Turbine (74199 B). Ills. 1100 w. Ind—Sept. 17, 1916. Means of preventing sand and mud from reaching turbine suction.

Valves

Valvola di riduzione e di sicurezza a lente per impianti idraulici (72112). Pons Giulio. Ills. 2500 w. I F—June 15, 1916. Calculations for reduction valves and safety valves for hydraulic plants.

Valve Wear

Der Einfluss des Kohlensäuregehaltes des Wassers auf die Haltbarkeit von Pumpenventilen (65977 B). Ills. 2000 w. Poly Rund—Oct. 30, 1915. Experience in the Oldenburg pumping plant with valve wear from CO₂ content in water.

Water Brake

Design of a Water Brake (72027). Winslow H. Herschel. 2000 w. Pwr—July 25, 1916. Design and use in testing a turbine.

Water Power

Status of Water-Power Development (67306). Hydrographs. 3500 w. El W

Consult Classification of the Index. See page 7.

Waterwheels

—Jan. 15, 1916. Economic advantages of utilizing maximum stream flow with auxiliary steam stations.

Waterwheels

Results of Tests on High-Head Waterwheels (67148). Ills. 2000 w. El W—Jan. 8, 1916. Methods and results.

MACHINE ELEMENTS AND DESIGN**Gages**

Average Efficiency of Waterwheel Influenced by Size of Bucket (71139). John S. Carpenter. 1200 w. E R—June 17, 1916. Quotient derived by dividing the pitch diameter by the jet diameter conveys idea of performance.

MACHINE ELEMENTS AND DESIGN**Automatics**

"Automatics" (68540 N). Ralph E. Flanders. Ills. 30 pp. Int Eng Cong, Trans—Paper 120. Also discussion. Machine tools.

Balancing

Das Auswuchten umlaufender Maschinenteile (67705 B). E. Heidebroek. Ills. 2000 w. Z V d I—Jan. 1, 1916. Balancing of revolving parts of machines.

Ball Bearings

Design and Application of Ball Bearings (66362 N). H. J. Moysey. Ills. 19 pp. M A E—Nov. 27, 1915. Reviews history and gives details of applications.

The Design of Sliding Bearings (68128 A). E. H. Fish. Ills. 2500 w. Mch W—Feb. 4, 1916. Details of forms used.

Oil Groove Designing for Large Bearings (71904). C. N. Scott. Ills. 2000 w. S & I—July, 1916. To insure proper lubrication.

Manufacture of Ball Bearings (72167 A). Ills. 2000 w. Mch—Aug., 1916. Making of single-row ball bearings in a Chicago plant.

Electrical Machine Bearings (72970). Gordon Fox. Ills. 3000 w. Pwr—Sept. 5, 1916. Types used; materials; action under operating conditions.

See also Turbines under *Hydraulic Machinery*.

Cone Couplings

Beitrag zur Berechnung von Kegelschraubkupplungen und über Reibung und Schmierung (67045 B). H. Bonte. Ills. 2500 w. Z V d I—Dec. 18, 1915. Principles, friction and lubrication of cone couplings.

Crank Pins

Design of Hollow Crank Pins (68026 A). C. W. Benica. 500 w. R M E—Feb., 1916. Determining diameters.

Cranks

Crank-Making (73955 A). Joseph Horner. Ills. 1600 w. Mch W—Oct. 6, 1916. Serial, 1st part. Principal changes in methods.

Critical Speeds

Schnell umlaufende Rotoren und kritische Geschwindigkeit (68876 B). O. Föppl. Ills. 3000 w. Z g T—Feb. 29

1916. Serial, 1st part. Mathematical study of critical speed of rapidly rotating machines.

On the Whirling Speeds of Loaded Shafts (69021 A). William Kerr. Ills. 3000 w. Eng—Feb. 18, 1916. Serial, 1st part. For various machines.

Cutting Edge

The Evolution of the Cutting Edge (68918 A). Albert B. Middleton. 2000 w. I & C T R—Feb. 25, 1916. Review of development.

Design

Gemeinsame Probleme des Maschinenbaues (65456 B). K. Kutzbach. Ills. 4500 w. Z V d I—Oct. 16, 1915. Serial, 1st part. Problems in machine design, especially cranks.

The Principle of Similitude in Engineering Design (74097 A). T. E. Stanton. Read before the British Assn. 5500 w. Mch E—Oct. 13, 1916. Usefulness of the principle in solving problems.

Dies

Design and Manufacture of Dies (68464 A). George H. Hamilton. Ills. 3500 w. Mch—March, 1916. Standardization; examples of design.

Engine Design

Cylinder Diameters of Condensing Engines (73715 A). W. E. Wright. Diagrams. 1000 w. Mch W—Sept. 22, 1916. Method of calculating.

Fireboxes

Development of an Ogee Corner (69542). C. B. Linstrom. Ills. 600 w. B M—April, 1916. Method of laying out and shaping.

Fixtures

Jig and Fixture Details—Clamps and Straps (70720 A). R. F. Pohle. Tables. 500 w. Mch—June, 1916. Standards used by Gen. Elec. Co.

Gages

Gage-Making (67087 A). A. G. Robson. Ills. 1200 w. Mch W—Jan. 14, 1916. Internal and external cylindrical gages, and plate gages.

Complex Gage Making (70472 A). A. G. Robson. Ills. 1000 w. Mch W—May 5, 1916. Serial, 1st part. Suggestions.

Making Gages for Shrapnel Shells (71606). Albert A. Dowd. Ills. 2500 w.

Consult Classification of the Index. See page 7.

Gears

MACHINE ELEMENTS AND DESIGN

Screw Presses

I T R—July 6, 1916. Types used in manufacture of munitions.

Gears

Gear Teeth Without Interference or Undercutting (66890 A). John Edgar. Ills. 4000 w. Mch—Jan., 1916. Designing and generating flanks.

Design of Back-Gears (68468 A). M. R. Bowerman. 500 w. Mch—March, 1916. Method.

Four-Gear Epicyclic Trains (68470 A). M. Terry. Ills. 700 w. Mch—March, 1916. System and advantages.

A Variable Speed Transmission Gear (69010 A). Ills. 2000 w. Elm—March 3, 1916.

On Reduction Gears (70525 A). John H. Macalpine. 5000 w. Eng—May 5, 1916. Serial, 1st part. Comments on paper by McLaren and Welsh before Inst. of Engrs. & Shipbldrs. in Scotland.

Calculating Change-Gears for Hobbing Spiral Gears (70729 A). George Allington. 1000 w. Mch—June, 1916. Process giving accurate results.

Gear Teeth

The Strength of Gear Teeth (65606 A). Guido H. Marx and Lawrence E. Cutter. Ills. 5500 w. Am Soc of Mech Engrs, Jour—Nov., 1915. Read at San Francisco. Allowable stress.

Strength of Wheel Teeth (65624 A). W. M. Wallace. 1000 w. Prac Engr—Oct. 28, 1915. Derives formula.

Helical Gears

Strength of Double Helical Gears (69164 A). G. F. Long. Chart. 700 w. Mch W—March 17, 1916. Determining dimensions.

Indexing

Determining Indexing Movements for Angles (67617 A). 500 w. Mch—Feb., 1916. Tables and explanatory notes.

Jig Bushings

Jig Bushings (69991 A). R. F. Pohle. Ills. & Tables. 700 w. Mch—May, 1916. Standards used by Gen. Elec. Co.

Jigs

Studs and Nuts for Jig Work (71588 A). R. F. Pohle. 300 w. Mch—July, 1916. Tables of standards used by the General Electric Co.

Lathes

New Method of Building Lathes (70727 A). Ills. 2000 w. Mch—June, 1916. Building on the bed casting without machine work.

New Universal Turret Lathe (71591 A). Ills. 1500 w. I A—July 6, 1916. Machine tool handling heavy steel forgings, or high-speed brass work.

Limit Gages

The Limit Gage System in Principle and Practice (68342 A). W. H. Booth.

Read before Assn. of Engrs.-in-Charge. Ills. 5000 w. Mch E—Feb. 11, 1916. Explanation.

Machine Design

Some Considerations in the Design of Special Machinery (71932 B). Dwight S. Cole. 3300 w. M E—1916. Development of the art.

Machine Proportioning

Some Aids to Designing (65514). Ills. 1500 w. Sci Am Sup—Nov. 6, 1915. From *English Mechanic*. Proportioning machines to size of man.

Machine Tools

Report on Past Experimental Work on Cutting Tools (67023 D). Dempster Smith. Ills. 111 pp. M A E—Mar., 1915. General review.

Drilling Machine Design (70721 A). Ills. 2000 w. Mch—June, 1916. Defects and suggestions for improvement.

Machine-Tool Joints (71174 A). Fred Horner. 1500 w. Mch W—June 9, 1916. Serial, 1st part. Types of joints and fastenings.

Storage Arrangements on Machine Tools (71409 A). Fred Horner. Ills. 1200 w. Mch W—June 16, 1916. Serial, 1st part. Storage when out of use.

Pipe

Spiral Riveted Pipe (65738). C. B. Linstrom. Ills. 1200 w. Boiler Maker—Nov., 1915. Pattern for heavy plate.

Pipe Threads

Commission Des Filetages (72806 C + D). 3400 w. S E I N—May-June, 1916. Report of Committee on pipe threads. Tables of proposed standards.

Planing Machinery

Important Developments in Planing and Moulding Machines for Railway Carriage and Wagon Works (72004 A). Ills. 1500 w. R G—July 7, 1916. Leading feature is the interchangeability of the cutter-spindles and adjustments.

Proportion

Proportion (70078 A). James Stormonth. Ills. 1800 w. Mch W—April 21, 1916. Value to engineer.

Pump Impellers

Laying Out Cycloidal Pump Impellers (68471 A). Gus Luck. Ills. 1000 w. Mch—March, 1916. Simple mechanical method.

Screw Gages

The Production of Screw-Thread Gages (69439 A). W. Richards. Ills. 2000 w. Mch W—March 24, 1916. Serial, 1st part. Tool equipment and methods.

Screw Presses

Pressure Developed by Friction Screw Presses (70722 A). Fritz J. W. Sparkuhl. Ills. 1800 w. Mch—June, 1916. Analysis of operating conditions.

Consult Classification of the Index. See page 7.

Screws**MACHINE WORKS AND FOUNDRIES****Annealing****Screws**

Screws Used in Jig Design (69273 A). R. F. Pohle. Ills. and tables. 700 w. Mch—April, 1916. Special screws in Gen. Elec. Co.'s equipment.

Errors of Screws (70473 A). Ills. 1500 w. Mch W—May 5, 1916. Reprinted from Nat. Phys. Lab. pamphlet.

Shafts

Determination of Shaft Diameters (65634 A). 200 w. Mech Wld—Oct. 29, 1915. Chart and its use.

The Determination of Shaft Diameters (67250 A). William E. Wright. 800 w. Mch W—Dec. 31, 1915. Supplementing earlier articles. Diagrams to save calculations.

Shell Tools

Machine Tools for Shells (72776). 1600 w. T E S—July 28, 1916. Changes in tool design brought about by war conditions.

Spanners

Spanners and Their Angles (67089 A). James Stormonth. Diagrams. 2000 w. Mch W—Jan. 14, 1916. Designs and operation.

Spirals

Munition Work for Munition Workers—Milling Spirals (70103 B). Ernest Pull. Ills. 2000 w. E Ry—April 15, 1916. Precise instructions.

Springs

Federschwingungen mit besonderer Berücksichtigung des Eisenbahnwagenbaues (65400 B). Hans Hermann. Ills. 2500 w. Gla Ann—Oct. 1, 1915. Serial, 1st part. Mathematical examination of spring oscillation especially as applied to railroad cars.

Spring Making and Repairing (66270 N). 17 pp. Int R R Mas Blacksmiths Assn Pro—Aug., 1915. Committee report, series of short letters.

Helical Springs Under Centrifugal Action (66892 A). John S. Myers. Ills.

2500 w. Mch—Jan., 1916. Speed limit device when weight of spring is important. Coiling Machines for Springs (71640 A). Ills. 600 w. Eng—June 16, 1916. Probably largest cold coiler ever built.

Sprockets

Design and Construction of Sprockets (66894 A). B. D. Pinkney. Ills. 1800 w. Mch—Jan. 1916. Improvement in efficiency from accurate determination of dimensions.

Spur-Gearing

Spur-Gearing (71004 N). Daniel Adamson. Ills. 37 pp. I Mch E—May 19, 1916. Tooth shape and proportions; Lasche's investigations; materials, etc.

Hobbing High Prime Number Spur-Gears Without Special Mechanism (71726 A). Will O. Wynne. Ills. 2500 w. Eng—June 23, 1916.

Standardization

Why Standardize Machine Tools? (69922). L. P. Alford. 2000 w. I T R—April 27, 1916. Organization in case of war.

Threads

Unification des filetages (67736 C+D). Ills. 19 pp. S E I N, Bul—Nov.-Dec., 1915. Report of work of committee on the standardization of screw threads.

Tool Engineering

Tool Engineering in Motor Car Manufacture (71582 A). Ills. 27 pp. Mch—July, 1916. Organization, analysis of engine manufacture, etc.

Tools

An Opportunity for the Toolmaker (71587 A). F. B. Jacobs. 1800 w. Mch—July, 1916. Demand for tool designers.

Some Tools Used in Manufacturing the Corona Typewriter (70728 A). Ills. 1800 w. Mch—June, 1916. Devices used in producing a six-pound typewriter.

Tool System of Cadillac Motor Car Co. (70726 A). Edward K. Hammond. Ills. 6500 w. Mch—June, 1916. Serial, 1st part. Details of an efficient system.

MACHINE WORKS AND FOUNDRIES**Aluminum Drawing**

Collapsible Aluminum Cup (66203). J. P. Sheehy. Ills. 1000 w. M I—Dec., 1915. Details of drawing thin metal.

Ammunition

A Shell Machining Equipment (69702 A). Ills. 2500 w. Enr—March 24, 1916. Machines recently designed.

Lavorazione dei proiettili (70110 B). G. Orlandi. Ills. 250 w. Ind—April 16, 1916. Machining projectiles.

Chucks and Tools for Shell-Making (69326 A). Ills. 1000 w. Eng—March 17, 1916. British made tools.

The Murchey Collapsing Machine Taps (69595 A). Ills. 1000 w. Eng—March 24, 1916.

Annealing

A Note on the Annealing of Aluminum (71472 N). Richard Seligman and Percy Williams. 500 w. Faraday Soc—May, 1916. Anomalies observed.

The Annealing of Metals (71471 N).

Consult Classification of the Index. See page 7.

Arms

F. C. Thompson. 2200 w. Faraday Soc—May, 1916. Features of the problem.

Arms

Drilling, Reaming, and Straightening Rifle Barrels (69270 A). William H. Avis. Ills. 10,000 w. Mch—April, 1916. Details of manufacture.

The Military Rifle (69269 A). Douglas T. Hamilton and staff. Ills. 40 pp. Mch—April, 1916. Spanish Mauser rifle, history, operations.

The 12-In. Howitzer in National Defense (69308 A). C. A. Tupper. Ills. 2000 w. I A—April 6, 1916. Methods and machines.

Assembling

Assembling Methods of the Jones & Lamson Machine Co (67614 A). Edward K. Hammond. Ills. 2000 w. Mch—Feb., 1916. Systematized methods.

Conveyor System Aids Big Production (71940). Leslie V. Spencer. Ills. 3000 w. Aut—July 20, 1916. Improved assembly method in automobile construction.

Automatic Control

Automatic Mechanical Control of Lathes and Screw Machines (67866 A). L. D. Burlingame. Ills. Also discussion. 6500 w. A S M E, JI—Feb., 1916. Features most essential.

Control Equipments for Machine Tools (68130 A). Ills. 1200 w. Mch W—Feb. 4, 1916. Automatic controls for stated requirements.

Automatic Devices

Torres and His Remarkable Automatic Devices (65516). Ills. 2000 w. Sci Am Sup—Nov. 6, 1915. Remarkable work of a Spanish inventor.

Automatic Machines

Automatic Machine Development (65518). Ralph E. Flanders. Read at Int. Engng. Cong. Ills. 5000 w. Ir Trd Rev—Nov. 4, 1915. Applications; relation to production.

Automatic Machine Tools and Processes (65633 A). A. G. Robson. Ills. 700 w. Mech Wld—Oct. 29, 1915. Serial, 1st part. Design and construction.

Billiard Balls

Turning Ivory Billiard Balls (66887 A). Edward K. Hammond. Ills. 1500 w. Mch—Jan., 1916. Accuracy and finish with simple tools.

Boring

Jig Boring (78527 A). F. B. Jacobs. Ills. 1200 w. Mch W—Aug. 4, 1916. Serial, 1st part. Explains methods that will give accurate results.

Boring Tools and Boring Bars (73008 A). Ills. 1000 w. Mch W—Aug. 25, 1916. Suggestions for good practice.

MACHINE WORK AND FOUNDRIES**Castings**

Motor-Driven Horizontal Turbine Boring Machine (73104 A). Ills. & Plate. 800 w. Eng—Aug. 25, 1916. Detailed description.

Multiple Boring-Machine for Box-Making (69128 A). Ills. 600 w. Eng—March 10, 1916.

Brass

The Reclamation of Brass Ashes (72911 N). Arthur F. Taggart. 10 pp. A I Mt—Sept., 1916. Recovery of metal and unburned fuel.

Brass Founding

Deoxidizing Brass and Bronze (65844). 800 w. Brass Wld—Nov., 1915. The best deoxidizers.

Chemistry for the Brass Foundryman (70811). E. P. Later. 3500 w. Fnd—June, 1916. Serial, 1st part. Elementary methods for determinations of alloys.

Cartridge Cases

Commercializing Cartridge Case Manufacture (72869 A). Ills. 4500 w. Mch—Sept., 1916. Development of tools and methods.

Car Wheels

Casting Car Wheels by New Method (73028). Ills. 1500 w. I T R—Sept. 7, 1916. Explains process.

Case Hardening

See Heat Treatment.

Castings

Reckoning-out Weights of Castings (68129 A). Joseph G. Horner. Ills. 1200 w. Mch W—Feb. 4, 1916. Serial, 1st part. Methods; examples.

Making Parts for Sewing Machines (68000). H. Cole Estep. Ills. 4000 w. I T R—Feb. 10, 1916. Intricate pieces.

Turning Out Cheap Castings (68554 A). Walter J. May. 700 w. Mch W—Feb. 18, 1916. Reducing costs.

Steel Castings for American Battleships and Merchantmen (68904 A). Edwin F. Cone. Ills. 3500 w. I A—March 16, 1916. Large-scale work.

The Manufacture of Small Electrical Castings (68489). H. Cole Estep. Ills. 3000 w. Fnd—March, 1916. Details of molding practice.

Casting Hubs Onto Wheels in a Specialty Shop (70808). Ills. 1500 w. Fnd—June, 1916. Details of specialty foundry in manufacturing plant.

The Casting of Non-Ferrous Metals in Chill Moulds (71020 A). F. Johnson. Abstract of paper before British Found. Assn. 2800 w. Mch E—June 2, 1916. Advantages claimed. Suggestions.

Efficiency in Production of Automobile Cylinders (71602). Ills. 5000 w. Fnd—July, 1916. Molding and casting operations and methods of gating.

Consult Classification of the Index. See page 7.

Castings

MACHINE WORKS AND FOUNDRIES

Cupolas

Foundry Equations Expressed Without Numerals (71603). Russell R. Clarke. 6500 w. Fnd—July, 1916. Achievement greater than profit.

Malleable-Iron Castings (71627 A). E. Touceda, in *Iron Tradesman*. 2500 w. Mch W—June 23, 1916. Facts showing effect of constituents and criticizing past-specifications.

Steel Scrap in Various Foundry Mixtures (71475 A). G. S. Evans. Ills. 3000 w. I A—June 29, 1916. Effect on castings.

Producing Large Cast Steel Locomotive Frames (72208). Ills. 1600 w. Fnd—Aug., 1916. Molding, casting and annealing practice.

A Centrifugal Machine for Casting Pipe (73031 A). Ills. 2500 w. I A—Sept. 7, 1916. Results obtained by a Brazilian inventor. Theory of the process.

Acid vs. Basic Steel for Castings (73186 N). Edwin F. Cone. 2500 w. A F A—Sept., 1916. Confined to open-hearth steel. Methods are discussed.

Alloy Steel Castings (73184 N). David Evans. 1800 w. A F A—Sept., 1916. Defines term, and considers alloys.

Aluminum Castings and Forgings (73175 N). P. E. McKinney. 1500 w. A I Mt—Sept., 1916. Suggestions for preparing and casting the alloy.

Converter Steel Castings Low in Manganese (73155 A). Edwin F. Cone. 700 w. I A—Sept. 14, 1916. Unusual effect of attempts at economy.

Electric Furnace Practice in the Manufacture of Steel Castings (73177 N). T. S. Quinn. 2000 w. A F A—Sept., 1916. Results of 18 months' operation of a 1-ton Heroult furnace.

Production of Automobile Cylinders (72916). Ills. 3500 w. I T R—Aug. 31, 1916. Details of molding and casting.

Report of Committee on Specifications for Steel Castings (72903 N). 1000 w. A F A—Sept., 1916. Proposed changes.

The Making of Thin-Walled Castings (73173 N). R. S. B. Wallace. Ills. 2200 w. A I Mt—Sept., 1916. Methods used in the brass foundry.

The Manufacture of Manganese Steel Castings (72901 N). W. S. McKee. Ills. 24 pp. A F A—Sept., 1916. Difficulties and suggestions.

Theory and Practice in Gating and Heading Steel Castings (73193 N). Ralph H. West. Ills. 2500 w. A F A—Sept., 1916. Numerous practical gating problems, with suggestions.

The Use of Titanium in the Manufacture of Steel Castings (73188 N). W. A. Janssen. Ills. 3500 w. A F A—Sept.,

19166. Its use as a powerful deoxidizer and denitrogenizer.

The Use to Which Malleable Iron Castings Can Be Applied in Car Construction (73178 N). F. G. Lanahan. 3000 w. A F A—Sept., 1916. Recommended on account of superior quality; uses.

Chain

Making Chain Under Steam Hammers (67120 B). F. G. Coburn. Ills. 2500 w. I T R—Jan. 6, 1916. Methods at Boston Navy yard.

Making Chain Under Steam Hammers (68418 A). F. G. Coburn. Ills. 2000 w. M Rv—March, 1916. Details.

Chamfering

Chamfering Operations on the Brown and Sharpe Automatic Screw Machine (66322 A). W. Richards. Ills. 700 w. Mch W—Nov. 26, 1915. Details of work.

Channeling

Channeling and Channeling Machines 67612 A. Chester L. Lucas. Ills. 3000 w. Mch—Feb., 1916. For sheet metal work; principles.

Chisels

Chisels (68658 N). Henry Fowler. Ills. 700 w. I Mch E—Feb. 18, 1916. Specifications and standard treatment.

Chucks

Lathe Chucks (68460 A). Joseph Horner. Ills. 4000 w. Mch—March, 1916. Serial, 1st part. Faceplate and work-holders.

Copper

Elements of Casting Copper — Base Metal on Iron (72988). Russell R. Clarke. Ills. 4000 w. Fnd—Sept., 1916. Difficulties explained and successful method outlined.

Cores

New Expeditious Method of Baking Cores (70283 A). Ills. 1200 w. I A—May 11, 1916. Under-flow firing pits, under air pressure.

Cupola Melting

How Crude Oil is Used for Cupola Melting (72209). Bradley Stoughton. Before Pittsburgh Found. Assn. 2000 w. Fnd—Aug., 1916. Cost of fuel reduced.

Cupolas

A Pre-Heated Blast Cupola (69863 N). J. A. Parsons, with short discussion. Ills. 2500 w. S A I E, JI—March, 1916. Details; advantages.

Melting Gray Iron in the Baby Bunting Cupola (69286). F. West. Ills. 2000 w. Fnd—April, 1916. Characteristics of small diameter furnaces.

The Use of Borings in Cupola Operations (73191 N). James A. Murphy. 1500 w. A F A—Sept., 1916. Methods of using them and results.

Consult Classification of the Index. See page 7.

Cutting**MACHINE WORKS AND FOUNDRIES****Flue Welding****Cutting**

Cost of Gas Cutting (68466 A). J. F. Springer. Tables. 800 w. Mch—March, 1916. Oxy-hydrogen process.

Cutting Metals with the Oxy-Acetylene Flame (72847 A). Henry Cave. Ills. 4500 w. E M—Sept., 1916. Operation of the cutting torch and many applications.

Die Casting

Die-Casting Practice (65847). Charles Pack. 2200 w. Brass Wld—Nov., 1915. Processes in use; alloys used; etc.

The Production of Die-Pressed Castings (66885 A). Edward K. Hammond. Ills. 5000 w. Mch—Jan., 1916. Method and applications.

Dies

Typing, Punching and Holding Dies (65926 A). Joseph Horner. Ills. 1000 w. Mech Wld—Nov. 12, 1915. Directions for the work.

The Adjustment of Split Screwing-Dies (65632 A). Joseph Horner. Ills. 700 w. Mech Wld—Oct. 22, 1915. Serial, 1st part. Types in use; methods of adjustment.

Some Punch and Die Troubles (67618 A). Joseph M. Stabel. Ills. 3000 w. Mch—Feb., 1916. Effective remedies.

The Heat-Treatment of Drop-Forging Dies (67621 A). Frank E. Merriam. 1800 w. Mch—Feb., 1916.

Making Dies for Screw-Threads (70341 A). William C. Betz. Ills. 1200 w. Mch W—April 28, 1916. Suggestions.

Drafting

Drafting Room Practice in a Departmentalized Shop (72273). Ills. 1700 w. E N—Aug. 3, 1916. Details of methods adopted.

Drawing Brass Shells and Other Press Work (67237 A). G. R. Smith. 1500 w. Mch W—Dec. 24, 1915. Working methods.

Suggestions for Reading Working Drawings (65371). Fred West. Ills. 2000 w. Foundry—Nov., 1915.

Drill Steel

Shanking Drill Steels (72713). Charles C. Phelps. Ills. 2000 w. E & M J—Aug. 26, 1916. Recent methods of shanking and sharpening.

Drop Forging

Drop Forging (66271 N). Ills. 9 pp. Int R R Mas Blacksmiths Assn Pro—Aug., 1915. Committee report, series of short communications.

Drop-Hammers

Board Drop-Hammers (72176 A). Ills. 8000 w. Mch—Aug., 1916. Construction, operation and design.

Electrical Apparatus

Some Electrical Manufacturing Operations (69989 A). Chester L. Lucas. Ills.

2000 w. Mch—May, 1916. Making an electric-fan guard and other apparatus.

Electric Furnaces

Gronwall-Dixon Electric Melting and Refining Furnace (73190 N). John A. Crowley. Ills. 2000 w. A F A—Sept., 1916. Data on the construction and operation of a Detroit plant.

The Electric Furnace in the Foundry (72890 N). Eugene B. Clark. 6 pp. A F A—Sept., 1916. Observations based on experience.

The Grönwall-Dixon Electric Furnace (73034 A). Ills. 2200 w. I A—Sept. 7, 1916. Results in a year's operation in the production of special alloy steel.

The Ideal Electric Furnace for the Steel Foundry (73187 N). F. I. Ryan, E. E. McKee, and W. D. Walker. Ills. 3000 w. A F A—Sept., 1916. The single-electrode furnace is considered the ideal one.

Electric Machinery

The Assembling of Dynamo Electric Machinery (72756 A). P. Field Foster. Ills. 1500 w. Mch W—Aug. 18, 1916. Serial, 1st part. The present number deals with process of manufacture.

European Tools

Notes on the Machinery Industry on the Continent (73682 A). Alexander Luchars. 3000 w. Mch—Oct., 1916. Machine tool building in France, Italy and Switzerland; wages and costs.

Factories

A National Projectile Factory (72297 A). Ills. Plate. 3500 w. Enr—July 21, 1916. Serial, 1st part. Plant and equipment.

British Shell Factory (72431 A). Ills. 1100 w. I A—Aug. 10, 1916. Typical plant.

The New Home of the Jacobs Chuck (72223 A). W. E. Freeland. Ills. 1500 w. I A—Aug. 3, 1916. Hartford factory for fine machine work.

Fixtures

Application of the Three-Point Principle in Fixtures (67620 A). Albert A. Dowd. Ills. 5000 w. Mech—Feb., 1916. For lathe work.

Multi-Purpose and Adjustable Fixtures (68463 A). Albert A. Dowd. Ills. 4500 w. Mch—March 1916. Tools for turret lathe and vertical boring.

Flasks

Wooden Foundry Flasks (67358). Walter J. May. Ills. 500 w. B W—Jan., 1916. Flasks of moderate size produced at low cost.

Flue Welding

Flue Welding (66267 N). 8 pp. Int R R Mas Blacksmiths Assn Pro—Aug., 1915. Committee report, series of communications.

Consult Classification of the Index. See page 7.

Flywheels

Flywheels

Modellierung und Formerei von Schwungrädern (65484 B). Ills. 2000 w. St u E—Oct. 28, 1915. Methods of making patterns and forms for flywheels.

Forging

Forgings from Early Times Until the Present (68537 N). C. von Philp. Also discussion. Ills. 14 pp. Int Eng Cong, Trans—Paper 117. Review.

Recent Progress and Present Status of the Art of Forging with Special Reference to the Use of Quick-Acting Forging Presses (68536 N). A. J. Capron. Ills. 18pp. Int Eng Cong, Trans—Paper 116. Comparison of press with steam hammer.

Forgings for Shells (73530). Ills. 3500 w. T E S—Aug. 25, 1916. Materials and methods employed.

Trepanning Heavy Cylindrical Forgings (72870 A). Ills. 1200 w. Mch—Sept., 1916. Tools and methods.

Forging-Presses

Quick-Acting Forging-Presses (65933 A). A. J. Capron. Read before the Int. Engng. Cong. Ills. 4000 w. Engng—Nov. 12, 1915. Improved presses and their applications and operation.

The Rapid Production of Heavy Forgings (65940 A). 2500 w. Ir Age—Nov. 25, 1915. Review of A. J. Capron's paper, read before the Int. Engng. Cong. Forging press as competitor of hammer for heavy forgings.

Foundations

Casings for Machinery-Foundation Anchor Bolts (66923). Bruce Page. Ills. 1500 w. Pwr—Jan. 4, 1916. Formation of casings, materials, methods.

Foundries

A Converter Steel Foundry for Diversified Work (67692). Ills. 2000 w. Fnd—Feb., 1916. Description of the equipment.

Beitrag zur Gattierungsfrage in der Giesserei (68310 B). Richard Fichtner. Ills. 4000 w. St u E—Jan. 24, 1916. Serial, 1st part. Discussion of question of burdens in foundry operation.

Geschichtliche Entwicklung der Kupolöfen und ihr Betrieb (67717 B). H. Kloss. Ills. 2000 w. G-Z—Jan. 1, 1916. Serial, 1st part. Historical development of the cupola and its operation.

Foundry for Marine Engine Castings (68648 A). Ills. 1800 w. I A—March 9, 1916. American Shipbuilding Co., Cleveland, O.

A Continuous Foundry for Small Castings (69171 A). Ills. 3500 w. I A—March 30, 1916. Mechanical equipment of Westinghouse Cleveland plant recently constructed.

Converter Foundry for Varied Work

MACHINE WORKS AND FOUNDRIES

Foundry Practice

(69507). Ills. 2500 w. I T R—April 13, 1916. Reading Steel Casting Co.

Big Output on Limited Floor Space (69206). H. Cole Estep. Ills. 4000 w. I T R—March 30, 1916. Continuous methods at Cleveland Westinghouse plant.

Making Castings for Great Lakes Ships (70072). Ills. 1000 w. Fnd—May, 1916. New plant at Cleveland, O.

The Converter and Electric Furnace in the Manufacture of Steel Castings (70052). Ills. 4000 w. I T R—May 4, 1916. In Milwaukee.

A Successfully Operated Two-Ton Open-Hearth (70070). Ills. 1500 w. Fnd—May, 1916. Small furnace for making steel for casting.

Planning a Foundry From Its Future Operations (70809). E. F. Lake. 1500 w. Fnd—June, 1916. Details were figured before designing.

How to Build Your New Foundry Economically (72989). E. L. Shaner. Ills. 10 pp. Fnd—Sept., 1916. Factory planning; design and construction.

The Brass Foundry (73498 N). E. A. Barnes. 5 pp. A I Mt—Sept., 1916. Problems Solved; modern equipment and its arrangement.

Foundry Coke

Use of By-Product Coke in Foundries (72892 N). George A. T. Long. 1000 w. A F A—Sept., 1916. Use of this fuel in cupolas.

Foundry Office

The Foundry Office (74070). Max C. Phillips. 700 w. B W—Oct., 1916. Serial, 1st part. A practical system.

Foundry Practice

Modern Iron-foundry Practice (65778 A). W. Rawlinson. From a paper before the Jun. Inst. of Engrs. 1500 w. Mech Wld—Nov. 5, 1915. Serial, 1st part. Cupola design; coke consumption; air supply; metal mixtures, etc.

Good Sense in the Steel Foundry (65683). G. Muntz and E. Roubieu. Ills. 4000 w. Ir Trd Rev—Nov. 11, 1915. Causes and cures of troubles.

Notes on Steel Foundry Practice (66687 A). J. Peers, in *Foundry Trade Jour.* Ills. 2500 w. Mch W—Dec. 10, 1915. Hints for making intricate castings.

Das Formen eines Girard-Turbinen-Leitapparates (66223 B). E. Emmel. Ills. 2500 w. G-Z—Nov. 15, 1915. Details of molding turbine distributor.

Recent Improvements in Foundry Operations (66306). Thomas D. West. Ills., 6500 w. Fnd—Dec., 1915. Serial, 1st part. Read at Engng. Cong. Wider use of labor-saving devices in casting plants.

Consult Classification of the Index. See page 7.

Foundry Problems

MACHINE WORKS AND FOUNDRIES

Gear Machine

A Few Problems Confronting British Foundrymen (66934). H. Sherburn. 2500 w. Fnd—Jan., 1916. Waste in production.

The Modern Foundry Advance (66936). Richard Moldenke. From paper read before Am. Found. Assn. 3000 w. Fnd—Jan., 1916. Development, with summary of modern advances.

Australian Steel Foundry Practice (68177 N). A. M. Henderson. Read before Soc. of Chem. Ind., Victoria. 4000 w. Cw E—Jan., 1916. Serial, 1st part. Manufacturing processes.

Problems in Pipe Foundry Practice Discussed (67693). R. Robertson. Ills. 2200 w. Fnd—Feb., 1916. Economies of interchangeable patterns.

Recent Advances and Improvements in Founding (68535 N). Thomas D. West. Ills. 50 pp. Int Eng Cong, Trans—Paper 115. Also discussion. Review.

Some Observations on Continental Foundry Practice (68909 A). H. G. Barrett. Read before British Found. Assn. Ills. 2500 w. Mch W—Feb. 25, 1916. Training, business, working methods.

Labor Saving in the Foundry (69181 A). Richard Moldenke. Ills. 5000 w. E M—April, 1916. Improvements needed and possible.

Continuous Melting in a Small Foundry (69073 A). G. S. Evans. Ills. 4500 w. I A—March 23, 1916. Results of change.

Casting Iron Segments for New York Tunnels (69285). E. C. Kreutzberg. Ills. 2500 w. Fnd—April, 1916. Use of jarramming molding machines.

Prevention of Shots and Cavities in Iron Castings (69440 A). J. Peers, in *Found. Trd. Jl.* Ills. 900 w. Mch W—March 24, 1916. Causes and avoidance.

Planning Work Ahead in the Foundry (70589 A). 2500 w. I A—May 25, 1916. Methods to insure prompt delivery of castings.

One-Third of a Century in a Gray Iron Foundry (73195 N). Alfred E. Howell. 2200 w. A F A—Sept., 1916. Review of progress.

The Use of Cheaper Materials (73185 N). Charles C. Kawin. 1000 w. A F A—Sept., 1916. Economies from the use of scrap.

Foundry Problems

How Some Cleaning Room Problems Have Been Solved (72895 N). H. Cole Estep. Ills. 18 pp. A F A—Sept., 1916. Outlines methods for the solution of these problems.

Foundry Progress

How Practical Men Can Broaden Themselves (70812). Russell R. Clarke. 5000

w. Fnd—June, 1916. Suggestions for keeping pace with foundry practice.

Fuel

Uses of Gas in Munition Making (72156 A). Ills. 2500 w. E Rv—July 15, 1916. Heating applications; merits of gas furnaces.

Fuel Domes

Bosh Fuel Domes (65750 B). Frederick Louis Grammer. 2200 w. Engrs' Soc of W Penn, Pro—Oct., 1915. Study of conditions.

Furnace Doors

Chain Screen Doors (73025 B). Henry H. Wiegand. 1000 w. J I I & E C—Sept., 1916. Their use in metal, glass, and chemical furnaces.

Furnaces

Gas and Oil Fired Furnaces and Stoves (72165 A). Ills. 3000 w. Mch W—July 21, 1916. Types being employed in the production of munitions.

Jobbing Foundry Installs 2-Ton Furnace (73032 A). Ills. 1500 w. I A—Sept. 7, 1916. Design and performance of small open hearth furnace.

The 25-Ton Air Furnace (72894 N). F. C. Rutz. 600 w. A F A—Sept., 1916. Details of a furnace for melting malleable iron.

Galvanizing

Die verschiedenen Verzinkungsverfahren (67716 B). K. Arndt. Ills. 1500 w. G-Z—Jan. 1, 1916. Serial, 1st part. Brief description of various galvanizing methods.

Gas Cutting

Metal Cutting with Oxy-Acetylene Gas (69272 A). S. W. Miller. 3000 w. Mch—April, 1916. Review of practice.

Gas Furnaces

Gas Furnaces and Their Utility (73707 A). Ralph Hackett. Abstract of paper read before N. British Assn. of Gas Mgrs. 3000 w. I & C T R—Sept. 15, 1916. Systems of furnace-heating by gas in heat-treatment of steel, welding gas cylinders and other work.

Gatings

Symposium on the Influence of Gating on Castings (72898 N). 38 pp. A F A—Sept., 1916. Covering gray iron, malleable iron, steel and non-ferrous metal castings. Principles underlying gating problem.

Gear-Cutter

The Sykes Gear-Cutter for Double Helical Teeth (72401 A). Ills. 1200 w. Eng—July 14, 1916. A development of the principle underlying the Fellows gear-shaper.

Gear Machine

The Largest Herringbone Gear Hobbing Machine (66891 A). Ills. 1800 w.

Consult Classification of the Index. See page 7.

Gears

MACHINE WORKS AND FOUNDRIES

Heat Treatment

Mch—Jan., 1916. Special machine for generating Wuest type of herringbone gears.

Gears

Bakelite Micarta-D Gears and Pinions (72192). T. D. Lynch and R. E. Talley. Ills. 1400 w. El JI—Aug., 1916. Physical properties and advantages.

Laying Out Skew Bevel Gears (72867 A). Reginald Trautschold. Ills. 4000 w. Mch—Sept., 1916. Theory of design and method of cutting teeth.

Gear Wheels

Die federnden Zahnrad der Lotschberg-Lokomotiven, Typ 1-E-1 (74219 B). W. Kummer. Ills. 1300 w. S B—Sept. 30, 1916. Herringbone gears, 59 inches in diameter, for electric locomotives.

Grinding

Guest's Theory of Grinding (65641 A). 3000 w. Engr, Lond—Oct. 22, 1915. Critical discussion of J. J. Guest's paper, read before the Inst. of Mech. Engrs.

Grinding Wheel Truing Devices (65344 A). Douglas T. Hamilton. Ills. 6000 w. Mach, N Y—Nov., 1915. Attachments for applying diamond tools.

The Story of the Grinding Wheel (67419 A). C. W. Blakeslee. From a paper read at conference of salesmen of Abrasive Material Co. 3000 w. I A—Jan. 20, 1916. Development. Odd uses and abuse.

Methods of Holding Work for Grinding (67619 A). Douglas T. Hamilton. Ills. 7500 w. Mch—Feb., 1916. For different classes of work.

The Use and Abuse of the Grinding Wheel (69009 A). C. W. Blakeslee. Abstract of paper read at conference of salesmen of the Abrasive Material Co. 2500 w. Mch E—March 10, 1916. Precautions and suggestions.

Truing Devices for Grinding Wheels (72854 A). F. B. Jacobs. Ills. 1000 w. I A—Aug. 31, 1916. Use made of black diamonds and ordinary wheel dressers.

The Grinding of High Speed Steels (73724). C. E. Gillett in *Grits and Grinds*. Ills., 2500 w. I T R—Oct. 5, 1916. Causes of grinding difficulties, suggesting remedy.

Hardening

Roll Hardening (70719 A). Chester L. Lucas. Ills. 2000 w. Mch—June, 1916. Deals with cold-rolling machinery. Preparing the rolls.

Heat Treatment

Die Wärmebehandlung der Metalle (65401 B). J. Czochralski. Ills. 1500 w. Gie Z—Oct., 1915. Certain points in heat treatment of copper alloys.

The Heat Treatment of Iron and Steel in a Neutral Atmosphere (65717). Al-

fred H. White and Homer T. Hood. Shows it is possible to heat iron and steel in an internally fired muffle without any oxidation or formation of scale.

Materials Employed in Case Hardening (65379 A). R. A. Millholland. 1500 w. Ir Age—Nov. 4, 1915. Compares natural and manufactured materials.

Case-Hardening Retorts and Furnaces (65679 A). R. A. Millholland. Ills. 2500 w. Ir Age—Nov. 11, 1915. Materials employed; types of furnaces.

The Process of Case Hardening (65792 A). R. A. Millholland. 1800 w. Ir Age—Nov. 18, 1915. Influence of time and temperature.

The Heat Treatment of Iron and Steel in a Neutral Atmosphere (66280 N). Alfred H. White and Homer T. Hood. Ill. 16 pp. Mich Gas Assn Pro—Sept., 1915. Experimental results.

Volume Changes During the Hardening of Steel (66691 A). 2000 w. Eng—Dec. 10, 1915. Editorial review of research work at Charlottenburg Technical High School by E. H. Schulz.

Gas as a Case Hardening Agent (66281 N). Alfred H. White and Homer T. Hood. Ill. 33 pp. Mich Gas Assn Pro—Sept., 1915. Advantages based on experiment.

Carbon and High Speed Steel and Tempering of Taps and Dies (66268 N). 13 pp. Int RR Mas Blacksmiths Assn Pro—Aug., 1915. Committee report, series of communications.

Causes Underlying Steel Hardening (67254). Albert Sauveur. Ills. 2500 w. I T R—Jan. 13, 1916. Read at Int. Engng. Cong. Explanations of results.

Die Einrichtung einer neuzeitlichen Härterei und Vergütungsanlage (68859 B). A. Messerschmidt. Ills. 2500 w. Z V d I—Feb. 26, 1916. Description of hardening and treatment plant for tool steel of Fries and Company in Düsseldorf.

The Heat Treatment of Steel (68634 A). J. E. Stead. Read at Cleveland Inst of Engrs' meeting. 2000 w. I & C T R—Feb. 18, 1916. General laws.

The Heat Treatment of Steel (69588 A). J. E. Stead. Read before Cleveland Inst. of Engrs. 1800 w. Mch W—March 31, 1916. Changes obtained.

Heat Treatment of Carbon-Steel Locomotive Axles: Water vs. Oil Quenching (71446 N). C. D. Young. Ills. 12 pp. A S T M—June, 1916. Physical properties resulting from two forms of treatment.

Heat Treatment of Drop Forgings (71260). W. C. Peterson. 1200 w. I T

High-Speed Machinery MACHINE WORKS AND FOUNDRIES**Machining**

R—June 22, 1916. Fundamental problems.

Heat Treatment for Drop Forged Steels (71903). W. C. Peterson. 1200 w. S & I—July, 1916. Showing necessity for additional treatment after completion of formation work.

Hardening and Softening of Steels (72072 A). John H. Van Deventer. 3000 w. Mch W—July 14, 1916. Methods.

The Oxygen Content of Iron and Steel (72044 A). J. Allen Pickard. 2500 w. I A—July 27, 1916. Its effect on their properties.

What Is Heat Treated Steel? (71745 A). Lawford H. Fry. Ills. 2500 w. R M E—July, 1916. Its production and use.

Nota Sul Trattamento Termico Degli Acciai Dolci (72780 B). S. Consigliere. Ills. 1500 w. Ind—July 30, 1916. Heat treatment of mild steel. Methods used.

High-Speed Machinery

The Installation and Erection of High Speed Machinery (70088 A). J. A. McLay. Read before Assn. of Min. Elec. Engrs. Also discussion. 3000 w. I & C T R—April 21, 1916. Precautions necessary to avoid troubles.

Holding Devices

Holding Devices for Tapered Work (66895 A). Albert A. Dowd. Ills. 4500 w. Mch—Jan., 1916. Methods for either rough or finished work.

Imprinting

Marking Curved Surfaces by Machinery (73959). Ills. 1500 w. S & I—Oct., 1916. How machines can be adapted to the work.

Ingots

Ingots and Ingot Moulds (72133 N). Harry Brearley, with discussion. Ills. 40 pp. W S I S I, JI—March, 1916. Experimental study.

Inspection

The Inspection of Engineering Material (68912 A). J. D. Summerfield. Read before Birmingham Assn. of Mech. Engrs. 2500 w. Mch W—March 3, 1916. Serial, 1st part. Necessity, advantage, etc.

Japanning

Gas vs. Electricity for Japanning and Enameling Ovens (66746). C. L. Gehrich. Ills. 2200 w. A G L JI—Dec. 27, 1915. Advantages of indirect gas-heated ovens.

Jigs

Single-Spindle Drill Jigs for Component Machine Parts (68910 A). 700 w. Mch W—March 3, 1916. Serial, 1st part. Suggestions for useful devices.

Keys

Woodruff Keys and Keyways (68469 A). Ills. 1000 w. Mch—March, 1916. Blueprints and data furnished workmen.

Lacquering

The Art and Practice of Lacquering (66645). Francis A. Shepherd. 2000 w. B W—Dec., 1915. Serial, 1st part. Methods; application, effects, materials, appliances.

Lathe

Large Shell Lathe with Automatic Electric Control (72696 A). Ills. 1200 w. Enr—Aug. 11, 1916. Details of special lathes built recently by the British Westinghouse Co.

Lathe Control

Automatic Control Gear for Lathes (65935 A). Ills. 1200 w. Engng—Nov. 12, 1915. Details of a system claiming to provide a large range of speeds without changing gears or shifting belts, and other advantages.

Lathes

Inspecting Lathes (72864 A). John J. Ralph. Ills. 3500 w. Mch—Sept., 1916. Work of inspection engineer.

Testing Special Shell-Boring Lathes (72868 A). L. C. Morrow. Ills. 800 w. Mch—Sept., 1916. Methods.

90-in. Heavy Wheel Lathe (73716 A). Ills. 600 w. Eng—Sept. 22, 1916. Machine designed for turning driving wheels in the shortest possible time.

Lathe Work

Machining Rifling Bars on the Bench Lathe (69990 A). A. H. Cleaves. Ills. 1600 w. Mch—May, 1916. Details of work.

Limit Gages

The Limit-Gage System in Principle and Practice (68907 A). W. H. Booth. Read before Assn. of Engrs-in-Chrg. Ills. 1500 w. Mch W—Feb. 25, 1916. Serial, 1st part. Explanation.

Limit System

The Limit System in the Drawing-Office (65927 A). Ills. 1000 w. Mech Wld—Nov. 12, 1915. The essentials of the system.

Machine Control

Automatic Mechanical Control of Lathes and Screw Machines (66575 N). L. D. Burlingame. Ills. 35 pp. A S M E—Dec., 1915. Most essential features.

Machine Foundations

Foundations for Jar-Ramming Molding Machines (66716 N). E. S. Carman. Ills. 1000 w. A F A—Oct., 1915. Early types and recent developments.

Machining

Machining Valve-Seats (73713 A). Ills. 1200 w. Mch W—Sept. 22, 1916. Operations involved.

Consult Classification of the Index. See page 7.

Machine Tools**MACHINE WORKS AND FOUNDRIES****Non-Ferrous Casting****Machine Tools**

Entwicklung und Ziele im deutschen Grosswerkzeugmaschinenbau (66254 B). Arthur Schmidt. Ills. 2700 w. Z V d I—Dec. 4, 1915. Development of design, and scope of exceedingly heavy machine tools.

History of Machine Tools (66886 A). Joseph W. Roe. Ills. 5000 w. Mch—Jan., 1916. Early development in England and United States.

The Selection of Machine Tools (68029 A). George W. Armstrong. 2500 w. R M E—Feb., 1916. Each tool studied to secure greatest efficiency.

Milling

Milling Buick Aluminum Crank-Cases (68459 A). Edward K. Hammond. Ills. 2500 w. Mch—March, 1916. At Flint, Mich.

Milling Fixtures

Notes on the Design of Milling Fixtures (73953 A). Ills. 1500 w. Mch W—Oct. 6, 1916. Serial, 1st part. Methods to be employed in operating milling machines by unskilled labor.

Molding

Die Anfertigung eines Lehmmodells zu einem SpiralTurbinengehäuse und das formen desselben (67042 B). L. Emmelsen. Ills. 1800 w. G-Z—Dec. 15, 1915. Procedure of making a clay model and patterns for a spiral turbine-housing.

Molding the Packard "Twin-Six" Motor Castings (66933). Ills. 2500 w. Fnd—Jan., 1916. Intricate core work.

Cheap Coreboxes (67238 A). James Edgar. Ills. 800 w. Mch W—Dec. 24, 1915. Methods.

A New Bedding-in Method of Green-sand Moulding (68911 A). M. E. Galton. From paper before British Found. Assn. 1500 w. Mch W—March 3, 1916. Details.

How Sheaves Are Molded in an English Shop (68490). Joseph Horner. Ills. 3000 w. Fnd—March, 1916. Patterns, core boxes, molding methods.

Machine Molding in a Jobbing Steel Foundry (70037 A). O. J. Abell. Ills. 3000 w. I A—May 4, 1916. Methods used in making steel castings.

Permanent Molds for Non-Ferrous Metals (70074). Ills. 4000 w. Fnd—May, 1916. Information from various sources.

Venting Permanent Moulds (70546 A). Walter J. May. Ills. 1500 w. Mch W—May 12, 1916. Suggestions.

Successful Practice in Working High-Lead Mixers (71213). Russell R. Clarke.

Ills. 3000 w. B W—June, 1916. Suggestions.

Molding a Diesel Engine Cylinder (71605). Joseph S. Horner. Ills. 2500 w. Fnd—July, 1916. Details of the work.

Molding a Large Locomotive Cylinder (72210). B. Rupert Hall. Ills. 1000 w. Fnd—Aug., 1916. Details of work requiring care.

Molding Machines

Neuere Bauarten Bonvillainscher Formmaschinen (66273 B). U. Lohse. Ills. 2600 w. St u E—Nov. 25, 1915. Recent improvements in molding machines made by Bonvillain & Ronceray of Paris.

The History and Development of the Molding Machine with Sidelights on Latter-Day Practice (66718 N). J. J. Wilson and A. O. Backert. Ills. 71 pp. A F A—Oct., 1915. Classification and fields.

Neuerungen im Formmaschinenbau und Giessereibetrieb (66224 B). Pradel. Ills. 2000 w. G-Z—Nov. 15, 1915. Serial, 1st part. Recent German patents in molding machines, etc.

Jolt-Ram Machines for Light Castings (67114 B). Ills. 1500 w. I A—Jan. 6, 1916. Thin castings made at King Works, Buffalo.

Jolt-Ram Moulding Machines (67535 A). Ills. 700 w. Enr—Jan. 7, 1916. New machines built at Manchester, Eng.

The Introduction of Molding Machines in Foundries (73181 N). A. O. Backert. 18 pp. A F A—Sept., 1916. Presents advantages and letters from foundrymen who have used them with satisfactory results.

Molding Sand

Report of the A. F. A. Advisory Committee to the United States Bureau of Standards (72904 N). 700 w. A F A—Sept., 1916. Progress report.

Waste Foundry Sand (73179 N). H. B. Swan and H. M. Lane. 2000 w. A F A—Sept., 1916. Need of a process for cleaning sand at small expense.

Munitions

Munitions Making for Small Manufacturers (66286 A). Ills. 4000 w. E M—Jan., 1916. Account of work possible with present equipment, costs, profits, precautions.

Machine Tools for Munition Work (67665 A). Ills. 4500 w. Mch W—Jan. 21, 1916. Tools and their use.

Non-Ferrous Casting

Judging Non-Ferrous Metal Pouring Temperatures (67696). Russell R. Clarke. Ills. 6500 w. Fnd—Feb., 1916. Pyrometer method; judgment; final test, etc.

Consult Classification of the Index. See page 7.

Painting

Considerations in Good Furnace Practice (68232). R. R. Clarke. Ills. 2000 w. B W—Feb., 1916. Serial, 1st part. Melting of metals; use of crucibles.

Painting

Painting by Dipping, Spraying, and Other Mechanical Means (69840 A). Arthur Seymour Jennings, with short discussion. 6000 w. R S A, JI—April 7, 1916. Methods and results.

Patterns

Unique English Gear Pattern Making Machine (65846). Frank C. Perkins. Ills. 700 w. Brass Wld—Nov., 1915. Interesting mechanical wood worker.

Plaster-of-paris as a Patternmaking Material (66810 A). D. Gordon, in *Found. Trd. Jour.* Ills. 1500 w. Mch W—Dec. 17, 1915. Producing at reduced cost.

Altering Old Patterns (66458 A). William J. Horner. Ills. 1300 w. Mch W—Dec. 3, 1915. Examples.

Pattern Plates for Reducing Operating Costs (66935). D. Dalrymple. Presidential address to British Found. Assn. Ills. 3500 w. Fnd—Jan., 1916. Used to advantage in mechanical molding.

Modeling Clay as an Adjunct to the Foundry (67695). C. Vickers. Ills. 1500 w. Fnd—Feb., 1916. Patterns for repetition work and for changes and repair operations.

Pattern Barrels (69872 A). James Edgar. Ills. 1200 w. Mch W—April 14, 1916. Details of forms.

How Patterns Are Stored in an English Foundry (69287). Allan Hill. 700 w. Fnd—April, 1916. Simple system.

Making the Pattern for a Piston Valve Cylinder (71604). David Gordon. Ills. 6000 w. Fnd—July, 1916. Intricate core work and molding methods.

Using Plaster-of-Paris in Patterns and Moulds (71869 A). Walter J. May. 1000 w. Mch W—July 7, 1916. Advantages and disadvantages, and its use.

Suggested Standard for Pattern Parts (73192 N). W. W. Carlson. 2000 w. A F. A—Sept., 1916. Suggests a system of coloring the various parts of a pattern.

Planing

Planing Helical Surfaces (68462 A). Edward W. Miller. Ills. 800 w. Mch—March, 1916. Details of process.

Setting the Planer Radius Attachment (68472 A). John Lynch. Ills. 1500 w. Mch—March, 1916. Method for circular arcs.

Portable Shops

Portable Machine Shops for the United States Army (72263). W. S. Doxsey. Ills. 1000 w. I & R—Aug. 3, 1916. Detailed description.

MACHINE WORKS AND FOUNDRIES

Projectiles

Press-Work

Press-Work on a Universal Joint Cover (70724 A). Ernest A. Walters. Ills. 1200 w. Mch—June, 1916.

Projectiles

Lavorazione degli Shrapnels (65467 B). G. Orlandi. Ills. 1800 w. Indus—Oct. 24, 1915. Serial, 1st part. Compilation of information on shrapnel manufacture.

Shells of the Calibers Now in Service (65380 A). C. A. Tupper. 4000 w. Ir Age—Nov. 4, 1915. Information for munitions manufacturers.

Les machines-outils pour l'usinage des obus (66260 B). F. Hofer. Ills. 3000 w. G C—Dec. 11, 1915. Characteristics of shell-making machines; numerous examples.

La fabrication des obus (66221 B). Ch. Dantin. Ills. 5000 w. G C—Nov. 20, 1915. Processes of shell manufacture at French plants.

Cutting-Off and Facing Machines for Projectile Work (66075 A). Ills. 500 w. Eng—Nov. 19, 1915. Designed for rapid work.

High-Explosive Shell Manufacture (66099 A). Douglas T. Hamilton. Ills. 10500 w. Mch—Dec., 1915. Types and parts.

High-Explosive Shell Cartridge Cases (66103 A). Ills. 4000 w. Mch—Dec., 1915. Details of work.

Forging High-Explosive Shells (66100 A). Ills. 2000 w. Mch—Dec., 1915. New methods.

Machining High-Explosive Shells (66101 A). Ills. 4500 w. Mch—Dec., 1915. Methods in different countries.

Detonating Fuses for High-Explosive Shells (66102 A). Ills. 3000 w. Mch—Dec., 1915. Operations described.

Single Purpose Machines in Shell Making (66094 A). C. A. Tupper. 3000 w. I A—Dec. 2, 1915. Machines needed to produce 100 shells per hour.

Shell Machinery and the Adaptation of Existing Machine Tools for Shell Making (67088 A). W. J. Eves. From paper before the Belfast Assn. of Engrs. 2000 w. Mch W—Jan. 14, 1916. Serial, 1st part. Various operations required in producing shells.

High Explosive Shell Making in Australia (66967 N). Ills. 3000 w. Cw E—Dec., 1915. What Australian firms are doing.

Making the 6-In. British High-Explosive Shells (67112 B). Ills. 3000 w. I A—Jan. 6, 1916. Routine for making 100 shells per hour.

Making Cartridge Cases on Bulldozers and Planers (66889 A). Douglas T. Ham-

Pulleys

ilton. Ills. 1800 w. Mch—Jan., 1916. Details of operations.

Production of 8-In. and 9.2-In. Shells (68137 A). C. A. Tupper. Ills. 2500 w. I A—Feb. 17, 1916. Methods, machines, tests.

"Other Ways" of Machining Shell Cases (68555 A). Joseph Horner. Ills. 2500 w. Mch W—Feb. 18, 1916. Serial, 1st part. Expeditious methods.

The Manufacture of High Explosive Shells in France (68629 A). Abstract translation from *Le Génie Civil*. Ills. 3000 w. Enr—Feb. 18, 1916.

Shell-Varnishing Machine (69018 A). Ills. 900 w. Eng—March 3, 1916. For working internally.

Shell Making Tools (68916 A). Ills. 1100 w. Enr—Feb. 25, 1916. Chucks made in England.

Projectiles for Guns (71304). Ills. 2500 w. T E S—May 26, 1916. Development and manufacture.

La fabrication des obus en fonte (71326 B). Ch. Dantin. Ills. 7000 w. Gn Cv—May 27, 1916. Manufacture of cast iron shells.

Pulleys

Pulley Moulding by Machine (66323 A). Joseph G. Horner. Ills. 1800 w. Mch W—Nov. 26, 1915. Method.

Punching Machines

Some Hand-Operated Punching and Shearing Machines (69025 A). Ills. 2000 w. Enr—March 3, 1916. British built machines.

Records

Keeping Records (72180). Edward H. Kearney. 2000 w. N E—Aug., 1916. The engineer and the filing system of keeping records of machinery.

Rifles

Albert Ball's Magazine Rifle of 1863 (72175 A). Guy Hubbard. Ills. 3500 w. Mch—Aug., 1916. Machine tool development and rifle manufacture.

Riveting

Die Maschinen-Nietung unter Kontrolle (67731 B). E. Schuch. Ills. 2500 w. G A G B—Jan. 1, 1916. Description of machine to control process of automatic riveting.

Routing

Routing Systems in the Small Shop (70251). H. D. Wolcomb. Ills. 2000 w. R R—May 6, 1916. Benefits from fixed schedule.

Sand Blast

The Sand Blast (72022). James Steelman. Ills. 4500 w. B W—July, 1916. Importance of velocity. Types of apparatus.

How Sand Blast is Used in Modern Foundries (72987). H. Cole Estep. Ills.

MACHINE WORKS AND FOUNDRIES**Screw Machines**

14 pp. Fnd—Sept., 1916. Many types of apparatus now available.

Sand Blasting and Sand-Blast Machines (73116 A). J. J. Richardson. From a paper before Birmingham Assn. of Mech. Engrs. 1000 w. Mch W—Sept. 1, 1916. Its uses and types of machines.

Sandblasting and Sandblast Machines (72532 A). J. J. Richardson. Abstract of paper before the Birmingham Assn. of Mech. Engrs. 3000 w. Mch E—Aug. 4, 1916. History of the process, its applications, plants, machinery, etc.

Sand Preparation

Die Sandaufbereitungs-vorrichtungen der Alfred Gutmann Aktiengesellschaft für Maschinenbau, Altona-Ottensen (65402 B). Ills. 1800 w. Gie Z—Oct., 1915. Serial, 1st part. Methods and machines for preparing molding sand at Gutman plant in Altona, Germany.

Saws

Manufacture of Circular Metal Saws (72865 A). Frank M. Shaw. Ills. 3000 w. Mch—Sept., 1916. Selection of steel, and details of manufacture.

Schoop Process

Schoop Process of Pulverizing and Spraying Metals (68513 A). Lathrop Collins. 2200 w. S A E Bul—Feb., 1916. Process and applications.

Scrap

Report of Committee on Specifications for Foundry Scrap (73180 N). 4500 w. A F A—Sept., 1916. Tentative specifications for cast iron, malleable and steel scrap.

Best Method of Reclaiming Scrap (66269 N). 10 pp. Int RR Mas Blacksmiths Assn Pro—Aug., 1915. Committee report, series of communications on costs.

Economy in Scrap Yard Arrangement (66543 A). Ills. 1000 w. I A—Dec. 16, 1915. Reducing handling costs in Youngstown plant.

Classification of Scrap Material at the Naval Gun Factory (68960 N). E. W. Bonnaffon. 1200 w. A S N E, JI—Feb., 1916. Methods.

Grinding Brass Ashes in the Conical Ball Mill (67960 D). Arthur F. Taggart and R. W. Young. Ills. 2000 w. A I M E, Bul—Feb., 1916. Experiments on reclamation of metallics from scrap.

Scraping

Surface Scraping and Surface Plates (69271 A). Bryan T. Hawley. Ills. 1000 w. Mch—April, 1916. Practice.

Screw Machines

Cams and Tools for the Brown and Sharpe Automatic Screw Machine (67408 A). W. Richards. Ills. 1000 w. Mch W—Jan. 7, 1916. Serial, 1st part. Methods in designing.

Consult Classification of the Index. See page 7.

Screw Threads

The Radical Screw Machine (72430 A). W. E. Freeland. Ills. 1700 w. I A—Aug. 10, 1916. Fitchburg Co.'s automatic machine.

Screw Threads

The Rolling of Screw Threads (71900 A). James Steelman. Ills. 3800 w. C E M—July, 1916. Describes machines and process.

The Standardization of Screw Threads (71886). F. O. Wells. Ills. 10 pp. A R M M A—April 15, 1916. Shows that it is not the tools that have to interchange but the work done by them.

Sherardizing

The Sherardizing Process (71093). Oliver W. Story. 9000 w. M & C E—June 15, 1916. Theory and practice.

Shop Practice

Machine Shop Equipment and Methods (66096 A). 2500 w. I A—Dec. 2, 1915. Résumé of important developments, as given in papers by E. R. Norris and by H. F. L. Orcutt at Int. Engng. Cong.

Efficient Reclamation of Bolts and Nuts (67274). E. T. Spidy. Ills. 1000 w. R M E—Jan. 1916. Shop practice in handling.

Getting the Most Out of Tools (67275). B. W. Benedict. Abstract of paper presented to Am. Ry. Tool Foremen's Assn. 1500 w. R M E—Jan., 1916. Factors affecting efficiency.

Turret Lathe Practice (67409 A). Joseph Horner. Ills. 2000 w. Mch W—Jan. 7, 1916. Serial, 1st part. Details of accepted methods.

How Steel Pens Are Manufactured (67122 B). E. C. Kreutzberg. Ills. 3000 w. I T R—Jan. 6, 1916. Preparing steel and process of manufacture in American plant.

Some Problems in Tools, Machinery and Equipment for Manufacturing Purposes (68124 B). John H. Riggs. 2000 w. Ind Eng Soc—1915. Methods of production.

Some Phases of Efficiency in Machine Shop Practice (68122 B). A. E. Ahara, with discussion. 4000 w. Ind Eng Soc—1915. Remedies.

Roughing Out Fellows Gear Shaper Cutter Blanks (67615 A). Edward K. Hammond. Ills. 2000 w. Mch—Feb., 1916. Modifications in construction to adapt Gridley automatic.

Machine Shop Equipment, Methods and Processes (68538 N). H. F. L. Orcutt. 19 pp. Int Eng Cong, Trans—Paper 118. Improvements.

Machine Shop Equipment, Methods and Processes (68539 N). E. R. Norris. Ills.

MACHINE WORKS AND FOUNDRIES

Shop Practice

30 pp. Int Eng Cong, Trans—Paper 119. Review; also discussion.

Labor Saving Devices in the Machine Shop (69183 A). Albert A. Dowd. Ills. 3500 w. E M—April, 1916. First of a series of articles dealing with useful appliances.

Equipment, Processes and Methods for the Boiler Shop (68547 N). E. C. Meier. 16 pp. Int Eng Cong, Trans—Paper 127. Improvements in past 25 years.

Machining Operations on the Gear Shaper (68461 A). Ills. 2000 w. Mch—March, 1916. Jigs and fixtures for finishing saddle and cabinet.

Labor Saving Devices in the Machine Shop (69955 A). A. A. Dowd. Ills. 4000 w. E M—May, 1916. This number considers heavier machines and their attachments.

Labor Saving Devices in the Machine Shop (70610 A). Albert A. Dowd. Ills. 3000 w. E M—June, 1916. Third paper of series on developments of most efficient machines.

Building Interchangeable-Part Lathes (71211 A). O. J. Abell. Ills. 1800 w. I A—June 22, 1916. Machining practice.

Originality in a Hartford Machine Works (70713 A). Ills. 1600 w. I A—June 1, 1916. Features of wood screw machinery making plant.

Manufacture of Hacksaw Blades (71584 A). Frank M. Shaw. Ills. 3000 w. Mch—July, 1916. Steel used, machining, hardening, straightening and tempering.

Le decapage au bisulfate de soude (72105). MM. H. Le Chatelier et B. Bogitch. Ills. 3000 w. R Met—November 1915. Description of process for pickling with bisulphate of soda.

Hydraulic System in Modern Shell Plant (72224 A). F. L. Prentiss. Ills. 2200 w. I A—Aug. 3, 1916. Pumping equipment and other features in Cleveland shop.

Kodak Manufacturing Kinks (72169 A). Chester L. Lucas. Ills. 1500 w. Mch—Aug., 1916. Practice of the Eastman Kodak Co., Rochester, N. Y.

Machining 9.2-In. High-Explosive Shells (72226 A). G. F. Bryant. Ills. 1800 w. I A—Aug. 3, 1916. Sequence of operations with time data.

Engineering Service Plus Machine Building (73030 A). O. J. Abell. Ills. 3000 w. I A—Sept. 7, 1916. Expansion of Gisholt Machine Co.

Importance De L'Alésage Des Trous De Rivets (73510 B). Ills. 4000 w. Gn Cv—Aug. 26, 1916. Importance of drilling instead of punching rivet holes in steel work.

Consult Classification of the Index. See page 7.

Shops

MACHINE WORKS AND FOUNDRIES

Tempering

Production Methods in Gas Engine Plant (73035 A). O. J. Abell. Ills. 4000 w. I A—Sept. 7, 1916. Methods in plant at Evansville, Ind.

Production of Dies and Marking Devices (73378). Charles C. Lynde. Ills. 1800 w. S & I—Sept., 1916. Methods and tools.

Shops

See also *Factories under Aeronautics*.

Modern Ideas in a New England Shop (66708 A). W. E. Freeland. Ills. 1200 w. I A—Dec. 23, 1915. Plant of Athol Machine Co.

Large Frog and Switch Plant at Easton Built in Practically One Year (66152). Ills. 1500 w. E R—Dec. 4, 1915. New works of Wharton Co.

New Features in Forge Shop Design (67562 A). Ills. 1500 w. I A—Jan. 27, 1916. Plant recently built in Detroit.

Plant of Pioneer Drop Forging Works (67111 B). Ills. 2500 w. I A—Jan. 6, 1916. Arrangement and equipment of new shops at Hartford.

First Principles of Shop Planning (67452). F. M. Perkins. Ills. 3000 w. I T R—Jan. 20, 1916. Pattern shop and new general foundry of Puget Sound Navy Yard, Bremerton, Wash.

Huge Remington Small Arms Factory Represents Effective "Preparedness" (67580). Ills. 3000 w. I T R—Jan. 27, 1916. Plant at Bridgeport.

One of the New British Projectile-Making Factories (68089 A). Ills. 2500 w. Eng—Jan. 28, 1916. General description.

Remington Arms Plant, with Probably the World's Largest Factory Building, Erected in Eight Months (67697 A). Ills. 4500 w. I A—Feb. 3, 1916. Details of Bridgeport plant.

New Features in a Steel Stamping Plant (68903 A). Ills. 1200 w. I A—March 16, 1916. Methods at Detroit plant.

English Shop for Making Small Boilers (69541). A. L. Haas. Ills. 2000 w. B M—April, 1916. Model boilers made.

A Notable Machine Shop of Moderate Size (71210 A). W. E. Freeland. Ills. 1200 w. I A—June 22, 1916. Special features of a Hartford plant.

A Machine Shop With Notable Features (71906 A). Ills. 2000 w. I A—July 20, 1916. New Cleveland plant.

The Arrangement of Machine Shops (72538 A). Joseph Horner. Ills. 3800 w. Eng—July 28, 1916. Serial, 1st part. Shop plans and elevations and their services, and conditions to be kept in mind.

Plant for Making Electric Vacuum Cleaners (73033 A). Ills. 1800 w. I A

—Sept. 7, 1916. Interesting equipment of Cleveland shop.

Straight Line Forge Shop Plant Layout (73377). C. S. Kinnison. Ills. 1500 w. S & I—Sept., 1916. Routing of materials.

See also manufacture under **ELECTRICAL ENGINEERING, Transformers**.

See also Supply Manufacture under **STREET AND ELECTRIC RAILWAYS**.

Signal Systems

New Factory Signal System (69306 A). Ills. 1000 w. I A—April 6, 1916. Improved sound-producing devices.

Special Machines

Circular Forming Tools for No. 6 B. & S. Screw Machine (72866 A). William W. Johnson. 300 w. Mch—Sept., 1916. Tables of dimensions and their use.

Special Machines for Making Fuse Parts (72871 A). Ills. 5000 w. Mch—Sept., 1916. For drilling and milling.

Springs

Automobile Cushion Springs (72177 A). E. F. Lake. Ills. 4000 w. Mch—Aug., 1916. Methods of jappanning and means of conveying product.

Stamping

Speeding Up Metal Stampings Production (66242). Charles C. Lynde. Ills. 2000 w. S & I—Dec., 1915. Machines and system for good practice.

Stamping Machine for Marking Shells 70526 A). Ills. 1500 w. Eng—May 5, 1916. Detailed description.

The Kelly Shell-Marking Machine (70854 A). Ills. 300 w. Eng—May, 19, 1916. Brief description.

Pressing and Stamping Metals (72851 A). Oberlin Smith. Ills. 3000 w. E M—Sept., 1916. Serial, 1st part. Reviews recent developments and processes.

Pressing and Stamping Metals (74160 A). Oberlin Smith. Ills. 5000 w. E M—Nov., 1916. Third article of a series describing operations in work of shearing, punching, broaching, curling, etc.

Steel Castings

Steel Castings and Physical Properties (70714 A). Edwin F. Cone. Ills. 2000 w. I A—June 1, 1916. Initial structure, kind of annealing and dynamic tests.

Steel Castings for American Merchant and War Vessels (71600 A). Edwin F. Cone. Ills. 1800 w. I M E—July, 1916. Notable castings.

Steel Helmets

Manufacture of Steel Helmets for the French soldiers (65959). Jacques Boyer. Ills. 900 w. Sci Am—Nov. 27, 1915. Why and how two million were made in six months.

Tempering

Influence du Temps de Chauffage Avant la Trempe (74201 C + D). A. Porterin.

Consult Classification of the Index. See page 7.

Tool Drawings

Ills. 12000 w. R Met—Jan.-Feb., 1916. Results of experiments showing effect of rapidity of heating before tempering steel.

Tool Drawings

Tabulated Tool Drawings (78684 A). C. A. Kuhn. 1000 w. Mch—Oct., 1916. System of making drawings of tools and keeping records of tools made.

Tool Equipment

Machine Shop Tool Equipment (68589). H. D. Wolcomb. 3300 w. R R—March 4, 1916. Selection to meet requirements.

Toolroom

Trigonometry in the Toolroom (72755 A). W. Richards. Ills. 1500 w. Mch W—Aug. 18, 1916. Serial, 1st part. Explains derivation of trigonometrical tables in present number.

Tools

Notes on Toolmaking (72172 A). William Young. 2000 w. Mch—Aug., 1916. Notes on lapping, filing, and die work.

Tooth-Rests

The Application of Tooth-Rests (66809 A). Joseph Horner. Ills. 800 w. Mch W—Dec. 17, 1915. Serial, 1st part. Forms and work.

Tube Mill

New Electrically Driven Tube Mill (69892 A). Ills. 1200 w. I A—April 27, 1916. Installed at Canton, Ohio.

Tumbling

Tumbling as a Means of Preparing Work for Finishing (65928 A). 1500 w. Mech Wld—Nov. 12, 1915. Tumbling barrels and their use; media for polishing and finishing.

Tunnel Linings

Machining and Molding Cast Tunnel Linings (66093 A). Louis J. Josten. Ills. 2000 w. I A—Dec. 2, 1915. Special machinery employed.

Turret Lathe

Turret Lathe for Bars and Milling Machine (73462 A). Ills. 500 w. Eng—Sept. 15, 1916. Details of two British built machines.

Vises

Modern Machine Vises and Applications (68473 A). Frank H. Mayor. Ills. 2000 w. Mch—March, 1916. Range of work now performed.

Washed Metal

Process of Making Washed Metal (72483). Henry D. Hibbard. Also "The Removal of Metalloids in Washing." By Edward L. Ford. Ills. 3500 w. I T R—Aug. 10, 1916. Operation of plant.

Welding

Oxyacetylene Welding Practice (65343 A). S. W. Miller. Ills. 5500 w. Mach, N Y—Nov., 1915. Welding of malleable iron and copper and copper alloys.

Electric Welding (66272 N). Ills. 14 pp. Int RR Mas Blacksmiths Assn Pro—

MACHINE WORKS AND FOUNDRIES

Welding

Aug., 1915. Committee report, practice of different shops.

Discussion on "Answers to Some Questions on Electric Arc Welding" (Lincoln), Cleveland, Ohio, March 19, 1915 (66663 D). 2500 w. A I E E—Dec., 1915.

Electric Welding Machine (66633 A). Ills. 1000 w. Eng—Dec. 3, 1915. Power driven semi-automatic machine of British make.

Gas Welding and Cutting (66655 B).

I. Welding Heavy Parts. C. K. Bryce.

II. Use in Steel Foundries. J. B. Henry.

III. Armor Plate Cutting. A. F. Mitchell.

With Discussion. Ills. 30 pp. E S W P—Nov., 1915.

Oxy-Acetylene Welding (66447 A). M. H. F. Koch. 15 pp. S & S-W R C, Pro—Sept., 1915. Experience.

Oxyacetylene Welding at Braden (66146). Alma E K and J. R. Thill. Ills. 1500 w. E & M J—Dec. 4, 1915. Details of mine and smelter work.

Oxy-acetylene Welding Practice (66893 A). S. W. Miller. 3300 w. Mch—Jan., 1916. Sheet metal and boiler welding.

Autogenous Welding of Steel Tubing (67255 A). Ills. 2000 w. I A—Jan. 13, 1916. New process using continuous oxy-acetylene machines.

Notes on Electric Welding Practice (67925 A). Ills. 2000 w. El R—Jan. 21, 1916. Serial, 1st part. Methods and applications.

Electric Arc Welding (68199). R. H. Parsons. Ills. 2500 w. El T—Feb., 1916. Outfit and work.

Electric Welding in Boiler and Tank Shops (68025). George W. Cravens. Ills. 1800 w. B M—Feb., 1916.

Oxy-Acetylene Welding of Aluminum (67613 A). S. W. Miller. Ills. 4000 w. Mch—Feb., 1916. Procedure and examples.

The Autogenous Welding of Boiler-Plates (68268 A). Ills. 2200 w. Eng—Feb. 4, 1916. Reviews report, issued by Swiss Soc. of Steam-Boiler Owners; particulars of task by E. Höhn.

Use of the Oxy-Acetylene Process in Welding Boiler Work (68024). C. R. Sutton. Ills. 1500 w. B M—Feb., 1916. Suggestions.

High Temperature Flames in Metal Working (68541 N). H. R. Swartley, Jr. Also discussion. 22 pp. Int Eng Cong, Trans—Paper 121. Survey of metal welding and cutting processes.

Oxy-Acetylene Welding Practice (68465 A). S. W. Miller. Ills. 5800 w. Mch—March, 1916. Methods and difficulties encountered.

Repair-Shop Applications of Oxy-Acetylene (68996). Ills. 3500 w. El R JI—March 18, 1916. Variety of work.

Consult Classification of the Index. See page 7.

Welding

MATERIALS OF CONSTRUCTION

Abrasives

Welded Fireboxes (68950). C. E. Lester. Ills. 1500 w. B M—March, 1916. Methods and results.

Two Welded-Joint Failures (68741). E. Höhn, in *Schweiz Bauzeit.* Ills. 1000 w. Pwr—March 14, 1916. Two explosions of steam vessels.

Lead Burning (68467 A). James F. Hobart. Ills. 2500 w. Mch—March, 1916. Welding lead plates.

Welding a 4000-Ft. Steam Main (68742). Ills. 1500 w. Pwr—March 14, 1916. Manner of making joints.

Some Brief Descriptions of Welding Processes (69291). M. W. Ward. Ills. 1200 w. Pwr—April 4, 1916.

Welding Aluminum Automobile Bodies (69744 A). C. R. Sutton. Ills. 1500 w. I A—April 20, 1916. Savings by oxy-acetylene.

Symposium on Welding as Applied to Boilers (70552). 2000 w. Pwr—May 23, 1916. Opinions of prominent men on electric and oxyacetylene methods.

Electric Welding (70045 A). Julius Sauer. Abstract from *Elek. Zeit.* 2000 w. Eln—April 21, 1916. Methods.

Welding High-Speed Steel Electrically (69994 A). Frank Warren. Ills. 1200 w. Mch—May, 1916. Application of butt-welding and spot-welding methods.

Gas Welding of Copper (70512). J. F. Springer. Ills. 4000 w. B W—May, 1916. Fundamental principles of methods.

How to Make Oxy-Acetylene Welds (71344 A). Henry Cave. Ills. 3000 w. E M—July, 1916. Present paper considers importance of instruction.

A Few Notes on Repairing a Large Valve Chamber by the Quasi-Arc System of Electric Welding (73893 A). H. Ing-ham, with discussion. Ills. 1800 w. S A I E JI—Sept., 1916. Method of re-pairing.

Limitations of the Oxy-Acetylene Process (74156 A). Henry Cave. Ills. 2500 w. E M—Nov., 1916. Applications of the process and precautions.

The Quasi-Arc Welding System (73896 N). Ills. 1500 w. Cw E—Sept., 1916. A fusion process.

Welded Tips on Cutting Tools (73714 A). C. B. Auel. Ills. 1500 w. Mch W—Sept. 22, 1916. Methods in use.

Will Electric Welding Supplant Riveting in Fabricating Structural Steel? (74165). G. C. Hinckley. 1800 w. E. R—Oct. 28, 1916. Comparison of probable costs shows advantage of welded joints.

How to Make Oxy-Acetylene Welds (72054 A). Henry Cave. Ills. 4000 w. E. M.—Aug., 1916. Essentials of successful welding.

Repairing Fractured Locomotive Engine Frames by Oxy-Acetylene Welding (72012 A). Ills. 500 w. Eng—July 7, 1916. The required plant and the economy and advantages.

Electric Arc Welding Finds Many Uses in Mines and Mills (71992). J. A. Seede. Ills. 1500 w. M & E W—July 22, 1916. Portable equipment and applications.

Aluminum Welding (72170 A). Harry B. Hoover. Ills. 4000 w. Mch—Aug., 1916. With oxy-acetylene flame.

Electric Spot-Welding (72174 A). Douglas T. Hamilton. Ills. 4500 w. Mch—Aug., 1916. Electric spot-welding machine and its use.

Wire Drawing

Power Requirements for Wire Drawing (66243). Kenneth B. Lewis. Ills. 1500 w. B F & S P—Dec., 1915. Formulas and application.

Wiredrawing

Effect of Early Cutoff on Wire-drawing (71571). Thomas T. Eyre. Ills. 1000 w. Pwr—July 4, 1916. Explanation.

Wire Rods

How to Heat Wire Rods by Continuous Coil Method (66105). Ills. 3500 w. I T R—Dec. 2, 1915. Methods used at North Tonawanda, N. Y., by the Buffalo Bolt Co.

Strength of Oxy-Acetylene Welds (70730 A). S. W. Miller. Ills. 1200 w. Mch—June, 1916. Available knowledge.

A Short Cut in Welding Rolling Mill Pinions (70810). Ills. 1000 w. Fnd—June, 1916. New wax process combined with thermit.

Stability and Growth of Thermit Welding (70803). Ills. 1200 w. R & L E—June, 1916. Details and appliances.

Welding with the Electric Arc (71054). Frank C. Perkins. Ills. 2500 w. B M—June, 1916. Equipment and operation.

MATERIALS OF CONSTRUCTION

Abrasives

The Production of Abrasive Materials in 1914 (65765 N). Frank J. Katz. 20 pp. U S Geol Surv, II: 29—Oct. 26, 1915. Statistics.

Abrasive Materials in 1915 (71417). Frank J. Katz. 15 pp. U S G S, II:10—June 27, 1916. Consumption, production, &c, with an account of their various uses in industry.

Consult Classification of the Index. See page 7.

Alcohol**Alcohol**

L'emploi et le régime de l'alcool dans les industries chimiques et pharmaceutiques (69607 C + D). Duchemin. 28 pp. S E I N—Jan.-Feb., 1916. Manufacture and use of alcohol and rule for denaturing.

Allotropy

Metastability of Metals (66461). 1500 w. M & C E—Dec. 15, 1915. Work of Prof. E. Cohen.

A New Thermo-Electric Method of Studying Allotropic Changes in Iron or Other Metals (70539 N). Carl Benedicks. Ills. 2500 w. I r & St Inst—May, 1916. Principle and experiment.

Alloys

Gefügelehre Eisen- und Metall-Legierungen (67770 B). Georg Lindner. Ills. 2800 w. Z V d I—Jan. 15, 1916. Serial, 1st part. Discussion of microscopic texture of ferrous and non-ferrous alloys. Aliages (68832 N). A. Vosmaer. Ills. 5000 w. Ing—Feb. 12, 1916. Discussion of properties of various alloys.

Iron-Boron and Iron-Carbon Alloys (72646 A). Ills. 1000 w. I A—Aug. 24, 1916. Russian comparison giving properties and preparation as well as their equilibrium diagram.

Alloys to Withstand Internal Air Pressure (72909 N). S. D. Sleeth. 900 w. A I Mt—Sept., 1916. Care needed to secure density.

Notes on Some Copper Alloys (73294 A). Joseph Horner. 1500 w. Mch W—Sept. 8, 1916. Serial, 1st part. Reviews the history of such alloys, their composition, treatment, etc.

Some Copper-Aluminum-Iron Alloys (73496 N). W. M. Corse and G. F. Comstock. Ills. 14 pp. A I Mt—Sept., 1916. Preliminary results obtained in the examination of these alloys.

Alloy Steel

A Development of a High-Grade Alloy Steel at Low Cost (66478 A + D). J. B. Rhodes. 1200 w. A S N E—Nov., 1915. Castings and forgings from same mix.

Manufacture and Uses of Alloy Steels (67474 N). Henry D. Hibbard. 70 pp. U S B M—Bul. 100. Information on composition, characteristics and application.

Gases Occluded in Alloy Steels (74131 A). J. W. Donaldson. 2000 w. I A—Oct. 26, 1916. From a paper granted a Carnegie scholarship memoir by the Iron and Steel Inst. in May, 1916. Effect of different alloys on the nature and volume of the gases.

Aluminum

The Changes in Physical Properties of Aluminum with Mechanical Work

MATERIALS OF CONSTRUCTION**Brass**

(71473 N). F. J. Brislee. 1800 w. Faraday Soc—May, 1916. Specific heats of hard and soft aluminum.

Extending Aluminum's Field (74143). 1500 w. Aut—Oct. 26, 1916. How to make best use of aluminum alloy in automobile work.

Aluminum Dust

Aluminum Dust (67553). G. H. Clevenger. 700 w. M & S P—Jan. 22, 1916. Uses. Danger from explosions.

Armor Plate

How Modern Armor Plate Is Made (70324). E. L. Shaner. Ills. 4000 w. I T R—May 11, 1916. Processes involved.

Bearing Metals

Bearing Metals (67396 N). George H. Tinker. 1200 w. A R E A Bul—Oct., 1915. Tests and specifications.

Belting

The Manufacture of Leather Belting (66188 A). F. H. Small. 5000 w. A S M E JI—Dec., 1915. Tanning and subsequent treatment.

India Rubber and Belata Belting as Conveyor and Power Transmission Belts (69135 N). James Tinto. Ills. 7000 w. M A E—March 11, 1916. Characteristics and advantages.

Benzol

L'extraction du benzol du gaz d'éclairage et son emploi dans la fabrication des explosifs (67750 B). Daniel Florentin. Ills. 3500 w. Gn Cv—Jan. 15, 1916. Methods of extracting benzol from illuminating gas and its use in explosive manufacture.

Boiler Plugs

An Investigation of Fusible Tin Boiler Plugs (65661 N). George K. Burgess and Paul D. Merica. Ills. 35 pp. U S Bureau of Stand, Tech paper 53—Oct. 15, 1915. Importance of pure tin.

Brass

Constitution of Brasses (66690 A). O. F. Hudson and R. M. Jones. Read before the Inst. of Metals, London. Ills. 3000 w. Eng—Dec. 10, 1915. Brasses containing small percentages of tin; alloys of copper, zinc and tin.

Recrystallization of Cold-Worked Alpha Brass on Annealing (67430 D). C. H. Mathewson, and Arthur Phillips. Ills. 13500 w. A I M E, Bul—Jan., 1916. Metallographic study at Yale.

Recrystallization of Cold-Worked Alpha Brass on Annealing (70310 D). Ills. 4500 w. A I M E, Bul—May, 1916. Discussion of paper of Mathewson and Phillips.

Waste and Abuse of Brass and Bronze (71749 A). Russell R. Clarke. 1800 w. R M E—July, 1916. Sources of waste, with suggestions.

Consult Classification of the Index. See page 7.

Bronze

MATERIALS OF CONSTRUCTION

Crystallization

Physical Tests on Common High Brass Taken Parallel and at Right Angles to the Direction of Rolling (73495 N). William B. Price and Philip Davidson. Ills. 32 pp. A I Mt—Sept., 1916. Experimental study.

Seasoning, Cracking and Self-Annealing of Brass (72910 N). W. Arthur. Ills. 1200 w. A I Mt—Sept., 1916. Discussion.

The Effect of Corrosion on the Ductility and Strength of Brass (73310 A). Paul D. Merica. 2500 w. M & C E—Sept. 15, 1916. Recent investigations.

Notes on the Inspection of Bronze and Brass (74120 N). Ernst Jonson. 9 pp. A I Mt—Sept., 1916. Defects and how to discover them.

Recrystallization After Plastic Deformation (73742 D). Henry M. Howe. 10 pp. A I M E Bul—Oct., 1916. Discussion of the Mathewson and Phillips paper on "The Recrystallization of Cold-Worked Alpha Brass on Annealing."

Bronze

A Metallographic Description of Some Ancient Peruvian Bronzes from Machu Picchu (66511 B). C. H. Mathewson. Ills. 74 pp. A JI S—Dec., 1915. Metallographic study of characteristics and conclusions drawn.

The Microstructural Changes Accompanying the Annealing of Bronze (67757 N). Henry S. Rawdon. Ills. 3000 w. JI I E C—Feb., 1916. Experimental work of Bureau of Standards.

Microstructural Changes Accompanying the Annealing of Cast Bronze (Cu 88, Sn 10, Zn 2) (68747 N). Henry S. Rawdon. Ills. 17 pp. U S B S, Tech paper No. 60—Jan. 25, 1916.

The Bronze of Antiquity (72624 A). George Frederick. Ills. 3500 w. C E M—Aug., 1916.

See also Copper.

Cast Iron

Cast Iron: The Strength and Properties of Castings (67989 N). E. L. Rhead. Ills. 7500 w. M A E—Jan. 22, 1916. Composition and influence of constituents.

A Chemical Explanation of the Effect of Oxygen in Strengthening Cast Iron (67948 D). W. McA. Johnson. 1000 w. A I M E, Bul—Feb., 1916. Character of contained graphite.

The "Growth" of Internal-Combustion Engine Cylinders (72574 A). J. E. Hurst. Ills. 1600 w. Eng—Aug. 4, 1916. The phenomenon and its causes.

The Thermal Reactions of Cast Iron (73182 N). Thomas Turner. 3000 w. A F A—Sept., 1916. Research work, explaining behavior of cast iron in cooling.

Consult Classification of the Index. See page 7.

Cements

Lutes and Cements (68104). S. S. Sadtler. Read before Am. Inst. of Chem. Engrs. 4000 w. M & C E—Feb. 15, 1916. Tried formulas.

Chlorine

Liquid Chlorine (69639 N). G. Ornstein. Ills. 18 pp. A E I S—April, 1916. Manufacture and uses.

Chrome Steel

The Corrosion of High Chromium Steels (67418 A). Abstract of paper by Sir Robert Hadfield, read before the Faraday Society of England. 1000 w. I A—Jan. 20, 1916. Characteristics of "stainless steel."

Initial Temperature and Critical Cooling Velocities of a Chromium Steel (70540 N). C. A. Edwards, J. N. Greenwood and H. Kikkawa. Ills. 26 pp. Ir & St Inst—May, 1916. Investigations and conclusions.

Copper

Kupfer und Bronze (66215 B). W. Müller. Ills. 2500 w. Z V d I—Nov. 13, 1915. Study of effect of working and heat treatment on tensile strength of copper and bronze.

L'écrouissage du cuivre (68808 C + D). Leon Guillet. Ills. 10 pp. R Met—Sept., 1915. Tests and results on hardening of copper by cold working.

The Brittleness of Annealed Copper (69649 N). W. E. Ruder. 4 pp. A E I S—April, 1916. Causes.

Copper Alloys

The Electrical Resistances and Temperature Coefficients of Nickel-Copper-Chromium Alloys (69620 N). Frederick M. Sebast. Ills. 28 pp. Renss Poly Inst—Nov. 6, 1916. Results of laboratory investigation.

The Transformations in Alloys of Gold with Copper (69852 N). N. Kurnakow, S. Zencuzny, and M. Zasedatelev. Ills. 27 pp. Inst Met—March 29, 1916. Thermic analysis, microstructure, electro-conductivity, hardness.

Corrosion

The Influence of Carbon and Manganese Upon the Corrosion of Iron and Steel (71734 A). Sir Robert Hadfield and J. Newton Friend. Read before Ir. & St. Inst. 4500 w. Enr—June 23, 1916. Results of research work.

See same heading under CIVIL ENGINEERING, *Materials of Construction*, and under MARINE AND NAVAL ENGINEERING.

See also Boiler Corrosion, under *Steam Engineering*.

Crystallization

Crystal Twinning by Direct Strain (68001). C. A. Edwards. Ills. 4500 w.

Crystal Structure

MATERIALS OF CONSTRUCTION

Iron Alloys

I T R—Feb. 10, 1916. Read before British Inst. of Metals. Investigation and conclusions.

Coarse Crystallization in Cold-Pressed and Cold-Drawn Steel Parts (71281 B). Ralph H. Sherry. Ills. 5500 w. S A E, Bul—May, 1916. Investigations to determine causes.

Crystal Structure

X-Ray and Crystal Structure, With Special Reference to Certain Metals (73382). 2000 w. B W—Sept., 1916. Abstract of lecture by W. H. Bragg, before Inst. of Metals, London. Account of new method.

Elastic Limit

Surface Tension Effects in the Inter-crystalline Cement in Metals and the Elastic Limit (70535 N). F. C. Thompson. Ills. 11700 w. Ir & St Inst—May, 1916. Theory and investigations.

Electric Furnaces

The Electric Furnace in the Foundry (66425 D). 1700 w. A I M E Bul—Dec., 1915. Discussion of William G. Krauz's paper.

Electric Steel

Electric Furnace Steels for Dynamic Stresses (65675). J. Edward Schipper. Ills. 5000 w. Automobile—Nov. 11, 1915. Improved methods giving stronger materials.

Electrolytic Iron

Review of Recent Progress in Electrolytic Iron (69641 N). Oliver W. Storey. 10 pp. A E I S—April, 1916. Manufacture and uses.

Discussion on "The Magnetic Properties of Some Iron Alloys Melted in Vacuo" (Yensen), St. Louis, Mo., Oct. 20, 1915 (70424 D). 8500 w. A I E E, Pro—May, 1916.

Explosives

Tetra-Nitro-Aniline (69458 B). W. W. Bradley. 2000 w. U S N I, Pro—March-April, 1916. Properties, uses.

Ferrous Alloys

The System Tungsten - Molybdenum (70892 D). Frank Alfred Fahrenwald. Ills. 1500 w. A I M E, Bul—June, 1916. Results of an investigation of one binary series of refractory alloys.

Firebrick

Characteristics of Firebrick for Boiler Furnaces (65715). E. H. Tenney. Ills. 1500 w. Elec Wld—Nov. 13, 1915. Effect of furnace conditions on firebrick.

Practical Methods for Testing Refractory Fire Brick (71453 N). C. E. Nesbitt and M. L. Bell. Ills. 24 pp. A S T M—June, 1916. Tests that imitate service conditions.

Forgings

Report of the Committee on Forging Specifications (68245 N). Ills. 13 pp. Am Ry Mas Mech Assn—Vol. 48, 1915. Specifications and tests recommended.

Oil Quenching Improves Solid Nickel-Steel Forgings (70334). C. J. Yarnall. Ills. 900 w. E N—May 11, 1916. Experiments on Quebec Bridge steel.

Glass

Glass Research (69700 A). 3000 w. Enr—March 24, 1916. Investigations and results.

Optical Glass (72569 A). Walter Rosenhain. 8500 w. R S A, JI—Aug. 4, 1916. Serial, 1st part. General properties, lens design, etc.

Production of Glass for Scientific Use (72543 A). Bertram Blount. 1500 w. Enr—July 28, 1916. Historical.

Glass Research (73734A). 2200 w. Enr—Sept. 22, 1916. Formulas for batch mixtures for many kinds of glass.

Ghost Lines

The Cause and Effect of "Ghost Lines" in Large Steel Forgings (66329 N). J. O. Arnold. Ills. 3200 w. I Mch E—Nov. 19, 1915. Research work.

Hardness

Note on the Relations Between the Cutting Efficiencies of Tool Steels and Their Brinell or Scleroscope Hardnesses (70538 N). J. O. Arnold. 700 w. Ir & St Inst—May, 1916. No relation between Brinell hardness and lathe efficiency.

Hydrogen

The Technical Production of Hydrogen and Its Industrial Application (69281). Harry L. Barnitz. 5000 w. M & C E—April 1, 1916. Processes and uses.

Insulating Materials

The Thermal Insulation of High Temperature Equipment (66426 D). Ills. 1500 w. A I M E Bul—Dec., 1915. Discussion of P. A. Boeck's paper.

The Heat Insulating Properties of Commercial Steam Pipe Coverings (66560 N). L. B. McMillan. Ills. 50 pp. A S M E—Dec., 1915. Extensive laboratory investigations.

Insulation

High Temperature Insulation (72665 A). P. A. Boeck. Ills. 4 pp. A S M E, JI—Aug., 1916. Requirements,

Invar

Invar and Related Nickel Steels (69755 N). Ills. 66 pp. U S B S, Circ. No. 58 with description of new material. —April 4, 1916. Properties, applications.

Iron Alloys

Magnetic and Other Properties of Iron-Silicon Alloys, Melted in Vacuo (67985

Consult Classification of the Index. See page 7.

Iron and Steel

MATERIALS OF CONSTRUCTION

Manganese Steel

N). Trygve D. Yensen. Ills. 65 pp. U I, Bul 83—Nov. 22, 1915. Methods of producing; mechanical and electrical tests. Vacuum-Fused Iron with Special Reference to Effect of Silicon (67963 D). T. D. Yensen. Ills. 28 pp. A I M E, Bul—Feb., 1916. Experiments showing electrical availability.

Iron and Steel

Ueber das Verhalten mehrerer Eisen- und Stahlsorten beim Druckversuch (65423 B). Herbert Monden. Ills. 3000 w. St u E—Oct. 7, 1915. Serial, 1st part. Results of experiments on behavior of certain irons and steels under compression.

Der Einfluss von Temperatur und mechanischer Arbeit beim Pressschmieden von Flusseisen und Stahl (65491 B). Otto Fuchs. Ills. 2000 w. Z V d I—Nov. 6, 1915. Results of experiments by commission to determine effects of heat and working on wrought iron and steel in the forge press.

Recherches sur les alliages de fer, silicium et carbone (65466 C + D). Georges Charpy and André Cornu-Thenard. Ills. 26 pp. Rev de Met—June, 1915. Investigation of thermal, chemical and structural characteristics of cast iron and steel carrying varying quantities of silicon and carbon.

Ueber die Ergebnisse von Schmiedeversuchen mit Flusseisen und Stahl (68881 B). P. Oberhoffer, L. Lanzor and H. Hammel. Ills. 2500 w. St u E—Mar. 9, 1916. Serial, 1st part. Results of forging tests carried on upon wrought iron and steel.

Linseed Oil

The Acceptability of Linseed Oil (71464 N). C. D. Holley. 6 pp. A S T M—June, 1916. Question of the acceptability of "foots" in linseed oil.

Lubricants

Value and Economy of Lubricants (66044). E. A. Siebel. Read before the Natl. Assn. of Sta. Engrs. 3500 w. N E—Dec., 1915. Characteristics and criteria.

Viscosity and Rate of Flow of Hydro-Carbon Oils (66077 A). 3500 w. Eng—Nov. 19, 1915. Editorial review of discussion in Inst. of Petroleum Technologists.

Viscosity and Its Relation to Lubricating Value (67214). Alan E. Flowers. 3500 w. Pwr—Jan. 11, 1916. Effect on "body" and lubricating value of an oil.

Tallow as a Lubricant: Its Microscopical Identification. (68302 A). James Scott. Ills. 1000 w. R E—Feb., 1916. Brief practical note.

Lubricants and Lubrication (68592). John D. Morgan. 1000 w. Pwr—March

7, 1916. Characteristics of good lubricant; testing.

The Merit of Graphite as a Lubricant (70064 A). H. Burnside. 900 w. B & L E—May, 1916. How graphite acts.

Emulsification of Mineral Lubricating Oils: Apparatus and Test Method (71447 N). P. H. Conradson. Ills. 7 pp. A S T M—June, 1916. Descriptive.

Graphite as a Lubricant (70731 A). C. H. Bierbaum. Ills. 1500 w. Mch—June, 1916. Impurities and their removal.

Quantitative Test for Resistance of Lubricating Oils to Emulsification (71445 N). W. H. Herschel. Ills. 18 pp. A S T M—June, 1916. Test for selection of non-emulsifying oils.

The Fractional Distillation of Lubricating Oils (71046 N). J. G. O'Neill. Ills. 5000 w. A S N E, JI—May, 1916. Methods of examining.

The Properties of Oils and Their Relation to Lubrication (70985 A). George B. Upton. 5000 w. S JI E—June, 1916. Purposes of various tests.

Data on the Oxidation of Automobile Cylinder Oils (71008). C. E. Waters. 18 pp. U S B S, Tech paper No. 73—May 31, 1916. Study made of three brands of oil.

Lubricating Oils (72831 N). J. L. Kauffman. Ills. 15 pp. A S N E, JI—Aug., 1916. Examination, laboratory and practical methods of testing.

Magnesium

Magnesium (69640 N). Wm. M. Grosvenor. 6 pp. A E I S—April, 1916. Manufacture and uses.

Malleable Iron

Malleable Iron—Its Use and Abuse (69888 A). Enrique Touceda. Ills. Short discussions. 38 pp. R C P, Pro—Feb. 25, 1916. History, characteristics, precautions necessary in manufacture.

What Is the Normal Fracture of Good Malleable Iron? (72902 N). Enrique Touceda. Ills. 7 pp. A F A—Sept., 1916. Appearance in oblique and in direct light.

Manganese-Bronze

Manganese- Bronze from Scrap (65845). J. B. Rhodes. 1200 w. Brass Wld—Nov., 1915. The production of manganese-bronze ingots, the materials used and foundry practice.

The Initial Stress Produced by the Burning-in of Manganese Bronze (72913 N). Paul D. Merica and C. P. Karr. Ills. 8 pp. A I Mt—Sept. 1916. Investigation of the failure of valve castings in the Catskill Aqueduct.

Manganese Steel

Manganese-Steel Castings in the Mining Industry (66414 D). Walter S. Mc-

Consult Classification of the Index. See page 7.

Metal Decay

Kee. Ills. 4000 w. A I M E Bul—Dec., 1915. Characteristics and applications.

Metal Decay

The Decay of Metals (69733 N). Cecil H. Desch. Ills. 15 pp. I E S S, Trans—March, 1916. Changes of unfavorable character which take place.

The Decay of Metals (70279 N). 4000 w. I E S S, Trans—April, 1916. Discussion of Desch's paper.

Metallography

Metallography of Steel for United States Naval Ordnance (67958 D). Harold Earle Cook. 7500 w. Micrographs. A I M E, Bul—Feb., 1916. Inspection, specifications, physical and chemical properties.

Metallography of Steel for United States Naval Ordnance (70304 D). 3800 w. A I M E, Bul—May, 1916. Discussion of Harold Earle Cook's paper.

Metal Reserves

Kriegsmetall-Beschaffung aus elektrischen Anlagen. (67741 B). Otto Heller. 2200 w. E u M—Jan. 9, 1916. Supply of metals in electric plants available for war purposes.

Metal Supplies

The Future of the World's Metal Supplies (67099 A). Donald M. Liddell. 4500 w. E M—Feb., 1916. Analyzes present situation and draws conclusions.

Monel Metal

Monel Metal (65815 D). Charles M. Biddle, Jr. 1600 w. Ohio Soc Mech, Elec, & Steam Engrs, Jour—Vol. VIII. No. 1. A natural alloy of nickel and copper. The ore and process of extracting.

Monel Metal (69854). F. H. Mason. Ills. 1800 w. M & S P—April 22, 1916. Properties and production.

Nickel-Copper Alloys

The Electrical Resistances and Temperature Co-Efficients of Nickel-Copper-Chromium and of Nickel-Copper-Manganese Alloys (69648 N). F. M. Sebast and G. L. Gray. Ills. 10 pp. A E I S—April, 1916. Results of series of laboratory investigation.

Nickel-Silver

The Annealing of Nickel-Silver (Part I) (69850 N). F. C. Thompson. 31 pp. Inst Met—March 29, 1916. Results of research.

Non-Ferrous Alloys

Bronze Alloys for Automobile Construction (71287 B). W. M. Corse and G. F. Comstock. Ills. 2500 w. S A E, Bul—May, 1916. Chart and tests of many alloys.

Aluminum Bronze: Some Recent Tests and Their Significance (71461 N). W. M. Corse and G. F. Comstock. Ills. 27

MATERIALS OF CONSTRUCTION**Platinum Ware**

pp. A S T M—June, 1916. Tests on manganese bronze and aluminum bronze, and other materials.

Sur la structure des alliages cuivre-zinc et cuivre-étain (72106). M. Witold Broniewski. Charts. 4500 w. R Met—November, 1916. The structure of copper-zinc and copper-tin alloys.

Review of Non-Ferrous Materials Formerly Used; and of Some Worth Further Consideration for Turbine Blading Purposes (65789 A). Ills. 3500 w. Engr, Lond—Nov. 5, 1915. Materials and requirements for blading.

Old Metal

How a Large Manufacturing Company Disposes of Its Old Metal (73174 N). J. M. Bateman. Ills. 900 w. A I Mt—Sept., 1916. Methods recently adopted at Hawthorne works of the Western Electric Co.

Open-Hearth

High Sulphur Does Not Injure Open-hearth Steel (68373). J. S. Unger. 2500 w. E N—Feb. 24, 1916. Practical tests.

Paper Yarn

Papierstoffgarne und -gewerbe (67706 B). W. Heinke. Ills. 3000 w. Z V d I—Jan. 8, 1916. Machines and methods for making and weaving paper yarn.

Die Verwendung der Papiergarne in der Kabelindustrie (67742 B). V. Planer. Ills. 1800 w. E u M—Jan. 9, 1916. Insulation uses of paper yarn for cables.

Pig Iron

Comments on the Tendencies of Merchant Pig Iron (66715 N). Oliver J. Abell. 1600 w. A F A—Oct., 1915. Purchase and sale for manufacture of castings.

Pipe

Recent Developments in the Standardization of Pipe and Pipe Fittings (68776 A). C. W. Ham. Ills. 2200 w. S J I E—March, 1916. Progress being made.

Pipe Failure

Failure of a Copper Steam Pipe (72545 A). S. A. Houghton and P. McNeil. Ills. 3000 w. Eng—July 28, 1916. Explosion on the Clan Urquhart.

Pipe Flanges

Oval Flanges for Steam, Air, Water, and Other Pipes (70850 A). Fairfax. 1500 w. Mch W—May 26, 1916. Serial, 1st part. British standards, and the need for further standard flanges.

Platinum Ware

A Study of the Quality of Platinum Ware (65974 N). George K. Burgess and P. D. Sale. Ills. 27 pp. U S Bureau of Stand—Nov. 8, 1915. Thermoelectric method for determining the purity of platinum ware, and its application.

Consult Classification of the Index. See page 7.

Pure Iron

MATERIALS OF CONSTRUCTION

Steel

Pure Iron

See same heading under MINING AND METALLURGY, *Iron and Steel*.

Recalcence

Early Experiments on the Recalcence of Iron and Steel (70541 N). A. Mallock. 1000 w. Ir & St Inst—May, 1916.

Refractories

Silica and Fireclay Materials (71648 A). John West. Ills. 2000 w. I & C T R—June 16, 1916. Manufacturing process and results of tests.

Practical Methods for Testing Refractory Fire Brick (72486). C. E. Nesbitt and M. L. Bell. Ills. 4500 w. M & C E—Aug. 15, 1916. Read before Am. Soc. for Test. Mat. Tests and results.

Some Aspects of the Testing of Refractories (74035 B). A. V. Bleining, with discussion. Ills. 34 pp. E S W P Pro—Oct., 1916. Information concerning the testing of the principal types.

Rivet Steel

The Effect of Sulphur in Rivet Steel (71802). J. S. Unger. Ills. 1200 w. B M—July, 1916. Effects of increasing the sulphur content.

Rope

Manila Rope (68071 D). F. E. Weise. Ills. 6000 w. Am Ry Brdg & Bldg Assn—Oct., 1915. Manufacture, structure qualities, tests; with discussion.

Rubber

Reclaimed Rubber (65786 A). 2000 w. Engr, Lond—Nov. 5, 1915. Methods and objects of reclaiming.

The Rubber Industry (66942). Andrew H. King. Ills. 5000 w. M & C E—Jan. 1, 1916. Serial, 1st part. Varieties of crude rubber, treatment, properties, etc.

Determination of Barium Carbonate and Barium Sulphate in Vulcanized Rubber Goods (68748 N). John B. Tuttle. 1200 w. U S B S, Tech. paper No. 64—Jan. 21, 1916. New method offering important advantages.

Hard Rubber in Automobile Construction (69462 B). McConnell Shank. 4000 w. S A E, Bul—March, 1916. Properties and manufacture.

Report of Committee D-11 on Rubber Products (71439 N). 6 pp. A S T M—June, 1916. Fire hose specifications.

Rustless Alloys

Rustless Ferro-Alloys (70083 A). Leslie Aitchison. 3000 w. Enr—April 21, 1916. Serial, 1st part. Nature of the problem; mechanical properties; elements for production, &c.

Scrap

Neuzeitlich-wirtschaftliche Metallabfall-Verwertung (67725 B). M. Buhle. Ills. 2000 w. E K u B—Jan. 4, 1916. Modern

methods in the economical reclaiming of scrap metal such as turnings.

Semi-Steel

I. Semi-Steel Defended and Attacked. Y. A. Dyer. II. Why the Term Semi-Steel Should Not Be Accepted Is Argued. Dr. Richard Moldenke (68485 A). 3000 w. I A—March 2, 1916.

Melting Steel and Gray Iron in a Cupola (69173 A). David McLain. 1800 w. I A—March 30, 1916. Data on the manufacture; present commercial position; criticism of Moldenke's conclusions.

Semi-Steel (73194 N). David McLain. Ills. 5000 w. A F A—Sept., 1916. History and metallurgy of this interesting product.

Shell Material

German Shells and the Influence of Certain Elements on the Physical Properties of Steel (67672 A). J. E. Stead. Read before Cleveland Inst. of Engrs. Ills. 3000 w. Enr—Jan. 14, 1916. Pieces analyzed.

Sherardizing

General Electric Practice in Sherardizing (65678 A). Ills. 2000 w. Ir Age—Nov. 11, 1915. Methods and tests.

Shop Chemicals

Acids and Alkalies for Shop Use (66325 A). E. H. Fish. 3000 w. Mch W—Nov. 26, 1915. Machine shops uses and general information.

Silica Brick

Manufacture and Tests of Silica Brick for the Byproduct Coke Oven (70305 D). 1700 w. A I M E, Bul—May, 1916. Discussion of Smith's paper.

Silicon Steel

Effect of Direction of Grain on Magnetic Properties of Silicon Sheet Steel (72199). L. W. Chubb and T. Spooner. 1200 w. El JI—Aug., 1916. Test methods and results.

Sizing

How Machinery Materials and Supplies Are Sized (67616 A). Fred Horner, 2000 w. Mch—Feb., 1916. Sheet metal, wire, sectional shapes, belts, ropes, chains, etc.

Specifications

Report of Committee on Specifications and Tests of Materials (71885 N). 34 pp. A R M M A—April 21, 1916. Recommended changes.

Report of Committee on Specifications and Tests of Materials (71871 N). 28 pp. M C B A—April 21, 1916. Proposed changes and new specifications.

Steel

Sur l'hétérogénéité des aciers (66232 C + D). Henry Le Chatelier and Jules Lemoine. Ills. 6 pp. R Met—July, 1915.

Consult Classification of the Index. See page 7.

Steel Castings

Causes of layers of perlite as revealed by Stead's reagent.

Alumina in Steel (66082). George F. Comstock. Ills. 2000 w. M & C E—Dec. 1, 1915. Difference between inclusions of alumina and silicates.

The Effect of Carbon on the Physical Properties of Heat-Treated Carbon Steel (66410 D). J. H. Nead. Ills. 1800 w. A I M E Bul—Dec., 1915. Experimental investigations.

The Chemical and Mechanical Relations of Iron, Molybdenum, and Carbon (66330 N). J. O. Arnold and A. A. Read. Ills. 5000 w. I Mch E—Nov. 19, 1915. Results of research work.

An Investigation of the Effect Produced by Varying the Sulphur Content of Basic Open Hearth Steel (66858 N). J. S. Unger. Ills. 3000 w. S A E—Jan., 1916. Investigation.

The Effect of Nitrogen in Steel (68139 A). B. Strauss. Abstract from *Stahl und Eisen*. Ills. 1200 w. I A—Feb. 17, 1916. German investigation at Krupp plant.

How to Select Industrial Steels (69957 A). Arthur E. Paige. 5500 w. E M—May, 1916. Information of practical value.

Steel Castings

Lack of Uniformity in Steel Castings (66709 A). J. H. D. Eagan. 2000 w. I A—Dec. 23, 1915. Causes and remedies.

The Initial Structure of Steel Castings (66095 A). Edwin F. Cone. Ills. 2500 w. I A—Dec. 2, 1915. Microscopic study.

Steel Impurities

Detecting Alumina Inclusions in Steel (72043 A). Albert Sauveur. Ills. 1500 w. I A—July 27, 1916. Investigation of the occurrence and appearance.

Tars

Die praktische Prüfung des Stahlwerksteers (67055 B). Jos. Wagner. Ills. 3500 w. St u E—Dec. 23, 1915. Tests on utilization of steel-work tars.

Textiles

Partial Report of Committee D-13 on Textile Materials (71440 N). Ills. 12 pp. A S T M—June, 1916. Methods for testing cotton fabrics; tin fabrics; hose, belting, &c.

Appendices to Report of Committee D-13 on Textile Fabrics (71452 N). Ills. 24 pp. A S T M—June, 1916. Methods of testing.

Tin-Aluminum Alloys

Some Tin-Aluminum-Copper Alloys (69851 N). A. A. Read and R. H. Greaves. 13 pp. Inst Met—March 29, 1916. Results of investigation.

Tool Steel

Character of High Speed Tool Steel

MATERIALS OF CONSTRUCTION

Zinc-Bronze

(68515). F. C. A. H. Lantsberry. 2500 w. I T R—March 2, 1916. Performance under various forms of treatment.

Vacuum-Fused Iron

The Effect of Vacuum Fusion Upon the Magnetic Properties of Pure Open Hearth Iron (70389). Trygve D. Yensen. Ills. 700 w. M & C E—May 15, 1916. Results of investigations.

Vanadium

Vanadium—Its Discovery and Qualities; Most Powerful Metal for Alloying Steel (66985 A). Ills. 800 w. R & L E—Jan., 1916.

Varnish

Varnish Analysis and Varnish Control (70821 N). Max V. Seaton and G. B. Sawyer. 3000 w. J I & E C—June, 1916. Serial, 1st part. Molecular weights of vegetable oils are considered.

Wire

Some Experiments on the Plastic Elongation of Wire (71459 N). A. V. de Forest. Ills. 10 pp. A S T M—June, 1916. The phenomena of "creep" or slow stretch of wire under load.

Wire Rope

The Care of Wire Rope (66686 A). Bruce W. Bennett. Abstract of paper read before the Shamokin Min. Inst. 2000 w. Mch E—Dec. 10, 1915. Suggestions and cautions.

Wire Rope: A Factor in Steel Making (66735). James F. Howe. 8000 w. I T R—Dec. 23, 1915. Read before the Assn. of Ir. & St. Elec. Engrs. Usage; reasons which led to its adoption.

Wire and Wire Rope (70405 A). Ills. 2500 w. E S P, JI—April, 1916. History; manufacture; types; uses.

The Wire Rope and the Coal Mine (71276). James Steelman. Ills. 3800 w. Cl A—June 24, 1916. Types and uses.

Wood Flour

Wood Flour (69276). Frederick W. Kressman. 1800 w. M & C. E.—April 1916. Properties and uses.

Wrought-Iron Pipe

Manufacture and Characteristics of Wrought Iron Pipe (70006). W. A. Phillips. Ills. 2000 w. G A—May 1, 1916. Processes and properties.

Zinc Bronze

Standard Test Specimens of Zinc Bronze (69159 N). Part I. C. P. Karr. Part. II. Henry S. Rawdon. Ills. 63 pp. U S B S, Tech paper 59—March 15, 1916. Preparation of test pieces; micro-structure.

Report on a Series of Comparative Tests of Zinc-Bronze (88 Cu—10 Sn—2 Zn) Standard Test Bars (73497 N). C. P. Karr. 12 pp. (Abstract.) A I Mt—Sept., 1916.

Consult Classification of the Index. See page 7.

Acetylene

MEASUREMENT

Densitometer

Acetylene

Calorimetric Determination of Acetylene and Its Application to the Determination of Water (68735 N). E. R. Weaver. 40 pp. U S B S, Sci paper No. 267—Feb. 29, 1916. Method and results.

Air Compressors

Commercial Methods of Testing Air Compressors (70477 A). H. Addison. 1800 w. Mch W—May 5, 1916. Serial, 1st part. Methods available and their success.

Anemometer

The Linear Hot-Wire Anemometer and Its Applications in Technical Physics (67446 B). Louis Vessot King. Ills. 6000 w. F I JI—Jan., 1916. Experimental investigations, theory, description of instrument and applications.

Angular Work

Sine Bar Applications (73681 A). Donald Baker. Ills. 2000 w. Mch—Oct., 1916. Details of construction and methods of obtaining accurate angular work, with tables of constants for 5-inch sine bar.

Automatic Calculators

Essais sur l'automatique (66219 B). Leonardo Torres y Quevedo. Ills. 11 pp. R G S—Nov. 15, 1915. Principles of automatic machines and especially action of author's "thinking machine."

Balance

Dynamic Balance (72661 A). N. W. Akimoff, with discussion. Ills. 12 pp. A S M E, JI—Aug., 1916. New machine with which dynamic balance can be easily obtained.

Bar Test

An Apparatus for Testing the Standard Cast-Iron Arbitration Bar (71442 N). H. L. Morse. Ills. 10 pp. A S T M—June, 1916. Design.

Boiler Meters

The Bailey Boiler Meter (70817). Ills. 1500 w. Pwr—June 6, 1916. Gives indication of the relation of air supplied to steam produced.

Boiler Test

Test of Boiler Vindicates Design (72189 A). S. M. Robinson. Ills. 1500 w. M Rv—Aug., 1916. Method of making an exhaustive test on a Ward boiler.

Calorimeters

An Aneroid Calorimeter (65967 N). H. C. Dickinson and N. S. Osborne. Ills. 25 pp. U S Bureau of Stand—Oct. 28, 1915. General principles of design, description, calibration, and experiments.

Charts

Surface Condenser Charts (72744). E.

Newman. Pwr—Aug. 29, 1916. Giving inside diameter of shell and number of tubes for various amounts of cooling surface.

Combustion Instruments

Construction of Combustion Instruments. (72480). R. L. Mossman. Ills. 1200 w. P E, C—Aug. 15, 1916. Directions for making gas analyzer and draft gage.

Computer

The Slide-Rule Replaced by a New Computer (71087). Yu Wang. Ills. 500 w. E N—June 15, 1916. Based on behavior of movable parallel lines.

Convex Heads

Stresses in Convex Heads (65744). F. F. Couch. Ills. 2000 w. Power—Nov. 16, 1915. Exceptions to analyses of stresses given in previous discussions.

Conveyor Belts

Nomographic Charts for Conveyor Belt Calculations (66939). Robert E. Haylett. 500 w. M & C E—Jan. 1, 1916. Chart and use.

Cottrell Process

Gas Volume and Dust Concentration Determination in Connection with the Cottrell Process (66187 A). William N. Drew. Ills. 2000 w. A S M E JI—Dec., 1915. The use of the Pitot tube for this purpose.

Covers

The Strength of Ribbed and Unribbed Covers (68086 A). C. C. Pounder. Ills. 900 w. Mch W—Jan. 28, 1916. Serial, 1st part. Formulas for stresses in covers of engines.

Currents

Induced Currents of Fluids (66023 D). Ills. 2500 w. Am Soc Civ Engrs, Pro—Nov., 1915. Discussion of F. zur Nedden's paper.

Curve Formulae

Empirical Formulae and the Equations of Curves (71176 A). 1500 w. Mch W—June 9, 1916. Serial, 1st part. Useful methods of finding the equations to the curves which fit approximately a number of plotted points.

Deformation

Vormveranderingsverschijnselen op het oppervlak van metalen, die aan de inwerking van uitwendige krachten worden blootgesteld (69600 B). E. C. W. van Dijk. Ills. 5500 w. Ing—March 11, 1916. Deformation lines on the surface of metals subject to stress.

Densitometer

The Densitometer (71641 A). G. A. Shakespear. Ills. 2000 w. Eng—June

Consult Classification of the Index. See page 7.

Ductility

16, 1916. Balance for finding specific gravities of solids.

Ductility

The Relation of Ductility to Elongation (67622 A). Hugo Friedmann. Ills. noted; cautions against the use of elongation figures. 1000 w. Mch—Feb., 1916. Peculiarities of figures.

Dynamometer

The Solution of the Traction Equation of a Vehicle in Motion by the Power Meter (66631 A). Abstract from *Génie Civil*. Diagrams. 3000 w. Eln—Dec. 3, 1915. Details and use.

Some Notes on the Fan Dynamometer (69038 N). J. Lawrence Hodgson. Ills. 11 pp. Inst Auto Engrs—March, 1916. Tests and results.

Engine Foundations

Graphic Method of Determining Resultant Unbalanced Forces on an Engine Foundation (72073 A). H. D. Lobley. 1500 w. Mch W—July 14, 1916. Explanation.

Fan Calculations

Centrifugal Fan Calculations by the "Specific Speed" Method (72827 N). M. C. Stuart. Curves. 28 pp. A S N E, Jl—Aug., 1916. New method of solving problems arising in the selection, installation and operation.

Fatigue

The Endurance of Metals Under Alternating Stresses (68926 N). B. Parker Haigh. Ills. 40 pp. W S I S I Jl—Nov., 1915. Investigations, and machines for conducting tests.

Flow

The Flow of Air Through Thin-Plate Orifices (66580 N). Ernest O. Hickstein. 20 pp. A S M E—Dec., 1915. Calibrating meter disks.

Experiments on Water Flow Through Pipe Orifices (72983 A). Horace Judd. Ills. 11 pp. A S M E, Jl—Sept., 1916. Experimental study.

An Investigation of the Laws of Plastic Flow (71009). Eugene C. Bingham. 40 pp. U S B S, Sci paper 278—June 5, 1916. Study of the theory and laws of viscous and plastic flow.

The Flow of Air Through Thin Plate Orifices (68656 A). Ernest O. Hickstein. Junior prize paper. 6000 w. A S M E Jl—March, 1916. Abstract of paper with discussion.

Flow Meters

The Bailey Steam-Flow Meter (69723). Ills. 2000 w. Pwr—April 18, 1916. For liquids or gases.

Flue-Gas

Calculating Dry Flue-Gas Loss (66037). Carleton W. Hubbard. 2500 w. Power—Nov. 30, 1915. Method of deter-

MEASUREMENT

mining the dry flue-gas loss, in relation to the carbon-dioxide contents.

Instruments for Recording Carbon Dioxide in Flue Gases (70268). J. F. Barkley and S. B. Flagg. Ills. 50 pp. U S B S—Bul 91. Tests and results.

Fuel Gas

Analysis of Fuel Gas (69973). R. L. Hallett. Ills. 1500 w. E & M J—April 29, 1916. Apparatus and methods.

Gaging

Gaging and Inspection Methods (73680 A). Douglas T. Hamilton. Ills. 23 pp. Mch—Oct., 1916. Serial, 1st part. Developments of interchangeable manufacture; methods of measurement; gages, etc.

Gases

Messgeräte für Druck und Geschwindigkeit von Gasen (65419 B). Ills. 2000 w. Z V d I—Oct. 9, 1915. Serial, 1st part. Construction and use of series of instruments for measuring gas pressure and velocity.

Gauges

Limit Gauges (73299 A). R. T. Glazebrook. Ills. 3000 w. Eng—Sept. 8, 1916. Serial, 1st part. Read before the British Assn. Various classes of gauges, their use, limits of accuracy, etc.

Gyroscopic Apparatus

Gyroscopic Torque Apparatus (70084 A). E. Rawson. Ills. 700 w. Enr—April 21, 1916. Apparatus for verifying formula.

Hardness

A Few Experiments on the Hardness Testing of Mild Steel (70542 N). W. N. Thomas. 3000 w. Ir & St Inst—May, 1916. Experiments described.

Testing Hardness of Rifle Parts (70723 A). A. F. Shore. Ills. 1200 w. Mch—June, 1916. Requirements of various parts.

Testing Non-Ferrous Metals for Hardness (72168 A). Hugo Friedmann. 2000 w. Mch—Aug., 1916. Applications of the Brinell method.

Heat

Principio di reciprocità fra temperatura e flussi di calore (69670 B). Umberto Puppini. Ills. 3000 w. M T—March 20, 1916. Discussion of relations between temperature and flow of heat.

Heat Balance

Calculating a Heat Balance (71484). W. A. Sperry. Lecture before N. A. S. E., Grand Rapids. 2000 w. N E—July, 1916. Method applied to an actual test.

Heat Transmission

Del riscaldamento dell'acqua nelle condotte (70159 B). Umberto Puppini. 3500 w. M T—April 10, 1916. Serial, 1st part. Discussion of the theory of heating water in pipes.

Horse-Power

Horse-Power

Nominal, Indicated, Brake and Shaft Horse-Power. How Ascertained and Their Relation to One Another (68797 A). Jas. Watt. (Prize essay.) Ills. 3000 w. M E & N A—March, 1916. Principles; methods of application.

Humidity

A Psychrometric Chart (69155). H. L. Parr. 1200 w. Pwr—March 28, 1916. Chart, table and example; for determining humidity.

Hydraulics

Application of Newton's Second Law of Motion to Certain Hydraulic Problems (67479 A). Ford Kurtz. 1800 w. C C E Jan., 1916. Discusses two phases of the application. Mathematical.

Hydrometer

Baume Hydrometer (72876). R. T. Stroh. Ills. 1500 w. N E—Sept., 1916. How to use it.

Hydrometer Scales

United States Standard Baumé Hydrometer Scales (70409). 11 pp. U S B S, Circ. 59—April 5, 1916. Origin of the Baumé scales in U. S.; use.

Hydrometry

Standard Density and Volumetric Tables (69727 N). 60 pp. U S B S, Circ. No. 19—March 30, 1916. Density tables for definition of hydrometer scales.

Impact

Discussion on Impact (72840 N). L. N. Edwards. 1300 w. A R E A, Bul—July, 1916. Table and suggestions, with critical comments.

Indicator Diagrams

Indicator-Diagram Peculiarities (72471). Thomas J. Rogers. 1600 w. Pwr—Aug. 15, 1916. Explanation of peculiarities shown.

A Study of Indicator Diagrams from a Compound Corliss (72345). Victor R. Gage. 1000 w. Pwr—Aug. 8, 1916. Shows the value of the temperature-entropy diagram as applied to such an analysis.

Iron Analysis

Analyzed Irons and Steels—Methods of Analysis (69447 N). 15 pp. U S B S, Circ. 14—March 20, 1916. Methods of Bureau of Standards.

Iron Spectrum

Interference Measurements of Wave Lengths in the Iron Spectrum (69728 N). Kevin Burns, W. F. Meggers, and Paul W. Merrill. 27 pp. U S B S, Sci paper 274—April 11, 1916. Covers region 3233 Å to 6750 Å.

Keys

Straight Keys and Their Strength Values (70725 A). Percival K. Reed. 1400 w. Mch—June, 1916. Chart and explanation of its use in checking the strength values.

MEASUREMENT

Metallography

Laboratories

Der Neubau des Laboratoriums für Technische Physik der Technischen Hochschule München (66214 B). Osc. Knoblauch. Ills. 2500 w. Z V d I—Nov. 13, 1915. Layout and equipment of new laboratories for applied physics in Munich Technical High School.

The National Physical Laboratory in 1915-16 (71729 A). Ills. 4000 w. Eng—June 23, 1916. Serial, 1st part. Editorial review of the past year's work.

Le rôle des laboratoires publics d'essais (72103). F. Cellier. 4200 w. R G S—June 13, 1916. The importance of public testing laboratories.

Laboratory Work

The National Physical Laboratory (72299 A). 3000 w. Enr—July 21, 1916. Serial, 1st part. Annual report.

Lubrication

A System for Plotting and Cross-Fairing Results in Lubrication Testing (68775 A). G. B. Upton. Curves. 1600 w. S J I E—March, 1916. Explanation of method devised.

Magnetic Testing

See Magnetism under ELECTRICAL ENGINEERING, *Electro-Physics*.

Manometers

Liquid Manometers for Light Pressures (70399). R. S. Bayard. Ills. 1200 w. Pwr—May 16, 1916. Analysis of principle of the U tube.

Metallography

Hauptarten der Aetzerscheinungen und die metallographischen Aetzverfahren (65460 B). J. Czochralski. Ills. 3000 w. St u E—Oct. 21, 1915. Serial, 1st. part. Etching of polished sections of rocks and metals.

The Present-Day Knowledge of Metals and the Engineer (66648 A). Clement E. Chase. 3500 w. C C E—Dec., 1915. Importance of microscopic study of materials under stress.

Eenige resultaten van metallografisch onderzoek die van belang zijn voor den ingenieur (66222 B). E. B. Wolff. Ills. 9000 w. Ing—Nov. 20, 1915. Application of metallographic study to purposes of the engineer.

The Determination of Grain Size in Metals (66411 D). Zay Jeffries, A. H. Kline, and E. B. Zimmer. Ills. 2500 w. A I M E Bul—Dec., 1915. Comparison of methods previously used and new method, with advantages of latter.

Nadere mededeelingen van het lid Dr. E. B. Wolff w. i. over eenige resultaten van metallografisch onderzoek, welke van belang zijn voor den ingenieur, in aan-

Metal Testing

sluiting op zijn gehouden voordracht van 26 Juni 1915 (70183 B). Ills. 15000 w. Ing—Apr. 22, 1916. Extensive discussion by various authors of Dr. Wolff's paper on the application of metallographic methods to engineering purposes.

Metal Testing

Examen des metaux par les rayons X (72107). M. H. Pilon. Ills. 1800 w. R Met—November, 1915. Examinations of metals by means of X-rays. The work of the G.-E. Laboratories.

Endurance and Impact Tests of Metals (71460 N). D. J. McAdam, Jr. Ills. 10 pp. A S T M—June, 1916. Methods developed at U. S. Naval Engng. Experiment Station, Annapolis, Md.

Testing of Metals at the Engineering Experiment Station (71041 N). D. J. McAdam, Jr. Ills. 2500 w. A S N E, JI—May, 1916. Metallographic examination and physical testing.

The Strength and Stiffness of Steel Under Biaxial Loading (70876 A). Albert J. Becker. Ills. 60 pp. U I, Bul, No. 85—April 10, 1916. Investigation to determine the laws governing when subjected to combined stress.

Metric System

Pan-American Use of the Metric System (68154 B). Frederick Brooks. 1600 w. B S C E, JI—Feb., 1916. Steps toward adoption.

The Metric Agitation (71585 A). Luther D. Burlingame. Ills. 5500 w. Mch—July, 1916. Changes involved in substituting metric system for English method.

Discussion of "Pan-American Use of the Metric System" (73358 B). Frederick Brooks, R. S. Weston, A. W. Parker and E. P. Adams. 10500 w. B S C E, JI—Sept., 1916.

Nozzles

The Flow of Air Through Nozzles (67986 N). Thomas B. Morley. 39 pp. I Mch E—Jan. 21, 1916. Production of jets of highest velocity.

Numerals

A Set of Proposed Standard Numerals for the Scales of Measuring Instruments (68099 N). A. P. Trotter. 1200 w. I E E, JI—Feb. 1, 1916. Col. A. Strange's designs and proposed changes in interests of simplicity.

Oil Flow

See same heading under CIVIL ENGINEERING Measurement.

Pallograph

The Sperry Pallograph (69019 A). Ills. 1600 w. Eng—March 3, 1916. Instrument simultaneously records vertical and horizontal transverse vibrations.

MEASUREMENT**Pyrometry****Pipe Flow**

The Flow of Viscous Liquids Through Pipes (71687 N). W. K. Lewis. 4000 w. JI I & E C—July, 1916. Study of the flow of mineral oils of varying viscosity.

Pipe Stresses

Courbe cycloïdale de distribution des vitesses dans les tuyaux (72109). M. Mognie. 6000 w. P C An—November, December, 1915. Cycloidal curves showing the distribution of stresses in pipes.

Pistons

The Strength of Pistons, Etc (73954 A). C. C. Pounder. Ills. 1500 w. Mch W—Oct. 6, 1916. Serial, 1st part. Embraces all plates loaded after the manner of a piston.

Planck's Law

A New Relation Derived from Planck's Law (68732 N). Paul D. Foote. 600 w. U S B S—Feb. 3, 1916. Displacement law from Planck spectral distribution equation.

Planimeters

The Polar Planimeter (65378). S. B. Redfield. Diagrams. 1300 w. Power—Nov. 2, 1915. Principle of its operation.

The Hatchet Planimeter (71021 A). Arthur H. Allen. Ills. 1500 w. Mch W—June 2, 1916. Serial, 1st part. How to make and use.

Power-Plant Recorders

Recording Power Plant Operations (65990 A). Julian C. Smallwood. Ills. 4000 w. Engng Mag—Dec., 1915. Fourth and concluding installment of series, taking up filing and interpreting.

Psychrometry

New Psychrometric Tables and Chart (71795). 2500 w. H & V M—July, 1916. Tables for cooling tower work.

Pumping

Pumping Machinery—Test Duty vs. Operating Results (70582 N). J. N. Chester. 2800 w. A W W A, JI—June, 1916.

Pumps

Analytical and Experimental Investigations Relating to Centrifugal Pumps (73151 N). Hubert Mawson. Ills. 25 pp. I C E, Paper No. 4167—1916. Investigations at the laboratory of the University of Liverpool.

Pyrometry

Characteristics of Radiation Pyrometers (65970 N). George K. Burgess and Paul D. Foote. Ills. 85 pp. U S Bureau of Stand—Oct. 28, 1915. Principles; types of instruments, calibration, sources of error, and adaptability.

"Center of Gravity" and "Effective Wave Length" of Transmission of Pyrometer Color Screens, and the Extrapolation of the High Temperature Scale (69142 N).

Consult Classification of the Index. See page 7.

Radiation

19 pp. U S B S, Sci paper 260—March 13, 1916. Accurate method for obtaining true effective wave length.

Luminosity of a Black Body and Temperature (69450 N). Paul D. Foote and C. O. Fairchild. 1400 w. U S B S, Sci paper 270—March 21, 1916. New method of deriving the relation.

Cobalt as an Element for Thermo-Couples (69647 N). O. L. Kowalke. Ills. 8 pp. A E S—April, 1916. Successful employment.

"Center of Gravity" and "Effective Wave Length" of Transmission of Pyrometer Color Screens, and the Extrapolation of the High Temperature Scale (70270). Paul D. Foote. 18 pp. U S B S, Sci paper 260—Mar. 13, 1916. Difference is discussed; simple method given for obtaining true effective wave lengths.

Luminosity of a Black Body and Temperature (70272). Paul D. Foote and C. O. Fairchild. 1500 w. U S B S, Sci paper 270—March 21, 1916.

Radiation

Studies of Instruments for Measuring Radiant Energy in Absolute Value: An Absolute Thermopile (69143 N). W. W. Coblentz and W. B. Emerson. 47 pp. U S B S, Sci paper 261—March 4, 1916. Results obtained.

Reciprocating Parts

Accelerating Force of Reciprocating Parts (72173 A). Hubert L. Watson. 1000 w. Mch—Aug., 1916. Diagram for determining inertia force for various piston positions.

Rings

Festigkeitberechnung von radial belasteten Ringen (66244 B). F. Kretzschmar. Ills. 1800 w. Sch—Nov. 24, 1915. Calculations and formulas for resistance of rings loaded radially.

Riveted Joints

Efficiency of Unsymmetrical Riveted Joints. (72348). R. N. Blackburn. 3500 w. Pwr—Aug. 8, 1916. Discussion of strength.

Rivet Strength

Countersunk Rivets (73202). R. Fleming. 2300 w. E N—Sept. 14, 1916. Results of research of literature on their strength.

Rubber

The Chemical Analysis of Rubber Goods (70388). Andrew H. King. 4000 w. M & C E—May 15, 1916. Procedure for general work.

Scales

Weighing-Scales (66888 A). F. J. Schlink. Ills. 4000 w. Mch—Jan., 1916. Principles of operation and methods of inspecting and testing.

MEASUREMENT

Screw Gages

Screw Gages (69705 A). Ills. 2000 w. Enr—March 24, 1916. From Physical Laboratory pamphlet.

Shaft Calibration

Shaft Calibration (70449 A). William H. Carter. Ills. 3500 w. A S M D, JI—April, 1916. Test and conclusions.

Shafts

Die günstigsten Abmessung raschlaufender Wellen mit Rücksicht auf ihre kritische Drehzahl (65979 B). Heinrich Holzer. Ills. 3000 w. Z g T—Oct. 30, 1915. Mathematical considerations in design of high-speed steam-turbine shafts.

The Whirling Speed of Shafts. (72694 A). W. M. Wallace. 1500 w. Enr—Aug. 11, 1916. Serial, 1st part. Methods of obtaining the deflections of a loaded shaft by use of tables.

Sieves

Origin and Development of the Testing Sieve (69139 A). H. E. Brown. Ills. 1400 w. C E S, JI—March, 1916. History.

Sizing

See *Materials of Construction*.

Spectroscopes

The Ruling and Performance of a Ten-inch Diffraction Grating (71065 A). A. A. Michelson. Ills. 1500 w. F I, JI—June, 1916. Investigation.

Distribution of Energy in the Visible Spectrum of an Acetylene Flame (71010). W. W. Coblentz and W. B. Emerson. 10 pp. U S B S, Sci paper 279—May 29, 1916. Quality and luminous efficiency.

Speed Sighting

Speed Sighting and Wind Deflection in Artillery (73016 A). George Greenhill. Ills. 3000 w. Enr—Aug. 18, 1916. A study.

Spur-gear Teeth

The Strength of Spur-gear Teeth (70342 A). William E. Wright. 700 w. Mch W—April 28, 1916. Diagram.

Steam Flow

Flow of Steam in Pipes (68593). W. L. Durand. Chart. 700 w. Pwr—March Diagram for Computing Flow of Steam in Pipes (70995). 600 w. Pwr—June 13, 1916. Diagram and its use.

Steam-Flow Measurement (73748 A). Ervin G. Bailey. Ills. 6500 w. A S M E, JI—Oct., 1916. Problem of steam metering, with description of an experimentally developed meter of the orifice type.

Steam Piping

Vereinfachtes zeichnerisches oder rechnerisches Verfahren zur Bestimmung der Durchmesser von Dampfleitungen (67043 B). Brabbée and Wierz. 1400 w. G-I—Dec. 18, 1915. Simplified graphic and

Consult Classification of the Index. See page 7.

Steam Tables

mathematical methods for calculating the size of steam pipes.

Steam Tables

Some Errors in Steam Tables (71177 A). 900 w. Eng—June 9, 1916. Calls attention to discrepancies.

Steel

Some Suggestions Regarding the Determination of the Properties of Steel (66422 D). Ills. 5500 w. A I M E Bul—Dec., 1915. Discussion of A. N. Mitinsky's paper.

Steel Testing

Tests on Various Steels with an Improved Torsion Testing Machine (65800 N). W. E. Lilly. Ills. 23 pp. Inst Civ Engrs of Ireland, Trans—Vol. XLI. Improved machine and its use, with discussion of results.

Science Testing of Malleable and Cast Steel (67694). Andrew Harley. Ills. 6500 w. Fnd—Feb., 1916. Address before the British Found. Asso. Manufacture of small castings.

Testing Malleable and Cast Steel (71938). Andrew Harley. Ills. 5500 w. I T R—July 20, 1916.

Strength of Metals

Cross-Relations of Strengths of Metals in Tension, Compression, Torsion and Transverse Loading (66549 A). G. B. Upton. 4500 w. S J I E—Dec., 1915. Results of tests.

Stresses

Analysis of Stresses in Connecting Rods (71050 N). Karl F. Smith. 2000 w. A S N E, JI—May, 1916. Shows formulae in use are misleading.

Brackets on Stanchions (73461 A). W. T. S. Butlin. 1000 w. Eng—Sept. 15, 1916. Mathematical method of solving the problem of stresses induced.

Synthesizer

A 32-Element Harmonic Synthesizer (67448 B). Dayton C. Miller. Ills. 4500 w. F I JI—Jan., 1916. Methods of harmonic synthesis, description of apparatus, applications.

Tanks

Gauging of Storage Tanks—Method of Accurately and Rapidly Determining the Volume Content of Material in Horizontal Cylindrical Tanks with Bumped Heads (70129 N). K. B. Howell. Ills. 2000 w. JI I & E C—May, 1916. Formulas and charts.

Temperature

Ueber Temperaturmessungen bei Verdampfungsversuchen (66278 B). M. R.

MEASUREMENT**Weights**

Schulz. Ills. 1200 w. Z g T—Nov. 20, 1915. Practice in measuring temperatures in calculating evaporation rates.

Thermodynamics

Zur Thermodynamik des Wasserdampfes (68875 B). Rudolph Plank. Ills. 5000 w. Z V d I—March 4, 1916. Contribution to theory of steam thermodynamics.

Threads

Unification des filetages (69606 C + D). H. Sebert. 3 pp. S E I N—Jan.-Feb., 1916. Communication on proposed standardization of threads for France and other countries.

Unifications Des Filetages (73523 C + D). Ills. 8500 w. S E I N—July-Aug., 1916. Account of work in standardizing screw threads by French War Department.

Turbine Blades

Berechnung von Schaufelstärken von Turbinenlaufrädern (65457 B). R. Camerer. Ills. 1600 w. Z V d I—Oct. 16, 1915. Calculations of the thickness of hydraulic turbine rotor blades.

Turbine Efficiency

Calculation of Turbine Efficiency by Use of Mollier Diagrams (67151). H. A. Cozzens, Jr. 1000 w. El W—Jan. 8, 1916. Diagram and use.

Valve Diagram

Special Valve Diagram Applied to Walschaert Gear. (72182). E. O. Waters. Ills. 3000 w. Pwr—Aug. 1, 1916. Analysis of the Walschaert valve gear and the application of a new graphical method of determining the valve travel.

Viscosity

The Unit of Viscosity Measurement (70130 N). Parker C. McIlhiney. 1500 w. JI I & E C—May, 1916. Conversion tables.

The Measurement of Viscosity and a New Forming Viscosimeter (72663 A). H. C. Hayes and G. W. Lewis, with discussion. Ills. 7 pp. A S M E, JI—Aug., 1916. Defines the coefficient of viscosity and develops a working formula. Types of meters.

Weights

Weights of Elements (65513). John Waddell. 2500 w. Sci Am Sup—Nov. 6, 1915. From *Chem. News*. Principles underlying choice of standard weights.

Weight-Calculating Tables: Metric (70544 A). 500 w. Mch W—May 12, 1916. Useful in estimating weights directly from dimensions in millimetres.

Consult Classification of the Index. See page 7.

Air Compressors POWER AND TRANSMISSION

Fuel Economy

Air Compressors

Centrifugal Air Compressors (65625 A). Ills. 1300 w. *Prac Engr*—Oct. 28, 1915. Surging effects.

High-Speed Air Compressors for Mining Work (67930 A). J. M. Walshe. From a paper before N. Staf. Inst. of Min. & Mech. Engrs. 7000 w. *C G*—Jan. 21, 1916.

Turbo Blowers and Compressors (68267 A). H. L. Guy and P. L. Jones. From paper in *Pro. of S. Wales Inst. of Engrs.* Ills. 4500 w. *C G*—Feb. 4, 1916. Design, governing, layout, etc.

Regulating Turbo Blowers or Compressors (67763 B). Carl Grosswendt. Ills. 2000 w. *B F & S P*—Feb., 1916. Discussion of characteristics.

High-Speed Air-Compressors for Mining Work (69736 N). J. M. Walshe. Ills. 2 plates. Discussion. 33 pp. *I M E, Trans*—March, 1916.

Belt-Drive

Where Belt Drive is Superior (72051 A). Henry Harrison Suplee. Ills. 3000 w. *E M*—Aug., 1916. Efficiency of mechanical transmission.

Belts

Transmitting Power by Leather Belting (68484 A). Robert Thurston Kent. 3500 w. *I A*—March 2, 1916. Tables for tensions and horsepower.

How to Reduce the Cost of Belting (69307 A). W. F. Schaphorst. 1500 w. *I A*—April 6, 1916. Lacing chiefly.

Power Transmitted by Belts (69980). R. T. Strohm. 1500 w. *N E*—May, 1916. Factors on which it depends.

Belts — Their Selection and Care (71351 A). C. J. Morrison. Ills. 8000 w. *E M*—July, 1916. Rules for designing a belt drive, with specifications for selecting and installing.

Care of Leather Belts (72025). J. O. Benefiel. Ills. 1500 w. *Pwr*—July 25, 1916. Directions for splicing, and general rules.

Blowing Engines

Verbund - Hochofengebläsemaschine (67771 B). F. Peter. Ills. 2000 w. *Z V d I*—Jan. 22, 1916. Description of compound blowing engine.

Building Vibrations

Graphic Analysis of Building Vibrations (66601). Elmer E. Hall. Ills. 2000 w. *El W*—Dec. 18, 1915. Necessity of mounting turbo-generators on independent foundations near ground.

Cement Plant

Power Plant of the Edmonton Portland Cement Co. (67536). A. G. Christie. Ills. 2000 w. *Pwr*—Jan. 25, 1916. Compact design; piping connections made as short as possible.

Chain Drive

The Use of Chain-Drives in Textile Machines (65932 A). Ills. 2000 w. *Engng*—Nov. 12, 1915. Deals particularly with "internal drives of textile machines."

Compressed Air

Compressed Air in Construction and Repair Work (66593). Charles C. Phelps. Ills. 1800 w. *Cl A*—Dec. 18, 1915. Work for which it is adapted.

Compressed Air in the Arts and Industries (68548 N). W. L. Saunders. Also discussion. 18 pp. *Int Eng Cong, Trans*—Paper 128. Reviews its many applications.

Compressed Air and Its Production (72875). Charles L. Hubbard. Ills. 4000 w. *N E*—Sept., 1916. Principles; power; types of compressors.

Compressors

Determining the Capacity of Compressors (71052 A). Paul Diserens. Chart. 1800 w. *I A*—June 15, 1916. Method, particularly for the user.

B. T. H. Turbo Air Compressors (73113 A). Ills. 1600 w. *El R*—Sept. 1, 1916. Advantages, design, construction, etc.

Turbo-Compressor for a Midlands Colliery (73014 A). Ills. 800 w. *Eng*—Aug. 18, 1916. Advantages.

Construction Plants

Selecting Construction Power-Plant System (65826). Editorial review. 3400 w. *Eng News*—Nov. 18, 1915. Advantages of steam, electricity, gasoline and compressed air for various services.

Factory Plants

Modernization of Power Plant in Factories (67251 A). W. A. Tookey. Read before Jun. Inst. of Engrs. 4000 w. *Mch W*—Dec. 31, 1915. Serial, 1st part. Details and difficulties.

Modernization of Power Plants in Factories (67086 A). W. A. Tookey. Read before the Jan. Inst. of Engrs. 5500 w. *Mch E*—Jan. 14, 1916. Serial, 1st part. Details to be considered in equipment to meet expected competition.

Electric Drive at Massillon Mill (67126 B). G. E. Stoltz. Ills. 1500 w. *I T R*—Jan. 6, 1916. Data of performance.

Making Power for Palmolive Products (69974). Ills. 2800 w. *P E, C*—May 1, 1916. Detailed description.

Remington Arms Power Plant at Bridgeport (70040 A). Ills. 3500 w. *I A*—May 4, 1916. Economies in a large turbo-generator plant.

Fuel Economy

The Production and Use of Power and Its Relation to Fuel Economy (71843 A). G. Stanley Cooper. 3000 w. *I & C T R*—

Consult Classification of the Index. See page 7.

Lubricants

June 30, 1916. Serial, 1st part. Deals especially with collieries, coke ovens, and iron and steel works, giving details of a power scheme.

Lubricants

Some Data on the Oxidation of Automobile Cylinder Oils (71686 N). C. E. Waters. 4000 w. J I & E C—July, 1916. Tests made of three oils and study of the influence of time and temperature of heating.

The Merits of Oil and Grease Lubrication (71832). W. J. Fouhy. 2500 w. M & E W—July 15, 1916. Their efficient use, and conditions that justify the use of various greases.

Lubrication

Bearing-Design Constants (68254). Louis Illmer. 4500 w. Pwr—Feb. 22, 1916. Serial. 1st part. Experimental and practical results.

Lubrication in Practice (69441 A). H. W. Petty. From paper before Assn. of Engrs.-in-Chrg. 2000 w. Mch W—March 24, 1916. Serial, 1st part. Lubricants discussed in present number.

Lubrication of Station and Industrial Machinery (69379). Arthur Curtis Scott. 2500 w. El W—April 8, 1916. Serial, 1st part. Operating requirements, lubricants.

Wire Rope Lubrication (70097). George R. Rowland. 1600 w. Cl A—May 6, 1916. Requirements of an efficient lubricant.

Lubrication Systems (71705 A). Eric W. Walford. Ills. 1500 w. Acr—June 24, 1916. Suggestions for improvement.

Steam Lubrication of Construction Machinery (71964 B). S. E. Lawrence. Ills. 2000 w. P M—July-Aug., 1916. Considers only the cylinder and valve side of the question.

The Lubrication of Quarry Machinery (71835 A). George R. Rowland, in *Lehigh Employes' Mag.* 3000 w. Qry—July, 1916. Important features to be considered.

The Lubrication of Gear-Teeth (72687 A). Ills. 2500 w. Eng—Aug. 11, 1916. Mathematical study.

Lubrication of Plant and Machine Tools (73118 A). J. D. Smith. 1000 w. Mch W—Sept. 1, 1916. Suggestions for securing efficient application.

Pressure Oil Film Lubrication (73463 A). H. T. Newbiggin. Read before the British Assn. Ills. 3300 w. Eng—Sept. 15, 1916. Deals with lubricants for reducing friction in bearings.

Motive Power

The World's Supplies of Fuel and Motive Power (67236 A). Thomas Hawksley lecture before Inst. of Mech.

POWER AND TRANSMISSION**Prime Movers**

Engrs. Dugald Clerk. 3000 w. Mch E—Dec. 24, 1915. Serial, 1st part. Industrial power and its sources. Future prospects.

Motor Drive

Why Motor Drive is Best (72050 A). William H. Easton. Ills. 3000 w. E M—Aug., 1916. Points in favor of electric drive.

Motor Drive for Operating Steel Rolling Mill (73612). William Knight. 3300 w. El W—Sept. 30, 1916. Analysis of requirements and graphical solution of the load imposed on a motor.

Power

Power Development of Brooklyn (73606 N. C. H. Stevens. Ills. 15 pp. Bklyn Engrs Club—1916. Possibilities and development of manufacturing.

Power Cost

Power Cost in Paper Mill (72344). Thomas Wilson. Ills. 2000 w. Pwr—Aug. 8, 1916. Operating costs. Engine units replaced by bleeder turbines.

Power Plants

Measuring the Water Used in Power-Plant Tests (70252). Charles G. Richardson. Ills. 2000 w. Pwr—May 9, 1916. Methods. Criticisms and suggestions.

Remodeling Power Plants (69982). H. Hamkens. Ills. 2500 w. N E—May, 1916. Substitution of oil fuel for coal.

Operating Conditions at Newark, Ohio, Power Plant (71858). W. O. Rogers. Ills. 1500 w. Pwr—July 18, 1916. Low proportion of combustible in the ashes and low percentage of make-up water.

Power Plant Considerations (71933 B). Burritt A. Parks. 4500 w. M E—1916. Illustrations of the average industrial power plant and methods for their improvement.

Power Plants and Factories Moved at Seneca Falls (72057). Ills. 3300 w. E N—July 27, 1916. Rearrangement due to construction of N. Y. Barge Canal.

New Fremont, Ohio, Power Plant (74090). Warren O. Rogers. Ills. 2000 w. Pwr—Oct. 24, 1916. A working pressure of 250 lbs. of steam superheated 125 deg.

Power for Law Making (73904). Ills. 2500 w. P E, C—Oct. 15, 1916. Plant furnishing light, heat, and power for state buildings at Springfield, Ill.

Power Supplies

Power Situation in Germany and Austria During the War (70993). 1800 w. Pwr—June 13, 1916. How power sources were mobilized.

Prime Movers

How to Select Prime Movers for Industrial Electrical Generating Plants (72052 A). H. T. Luscomb. 4500 w. E M—

Consult Classification of the Index. See page 7.

Shafting

Aug., 1916. Advantages and relative costs of different types.

Shafting

The Critical Speed of Shafts (71642 A). W. M. Wallace. 2000 w. Enr—June 16, 1916. Serial, 1st part. Study of the problem from the experimental or engineer's point of view.

Signaling

Power Plant Signaling Systems (66930). Norman G. Meade. Ills. 2500 w. N E—Jan., 1916. Alarms, telephone systems, etc.

Steam Hammers

Compressed Air vs. Steam for Steam Hammers (72481). J. P. Stone. 1500 w. P E, C—Aug. 15, 1916. Compressed air more economical than steam.

Waste Heat

Die Abwärmeverwertung im neuzeitlichen Kraftbetrieb (65461 B). B. Schapira. Ills. 2500 w. Feuer—Oct. 15, 1915. Serial, 1st part. Power plants using waste heat as gases from blast furnaces and coke ovens.

Water Power

Present Status of the Water-Power Situation (70505). H. W. Buck. Ills. 1200 w. El W—May 20, 1916. Review of essential considerations when comparing steam and water-power.

Relation of Water Power to Transportation (70419 D). Lewis B. Stillwell. 5000 w. A I E E, Pro—May, 1916. Conditions which determine the value of water power.

The Water Power Situation, Including Its Financial Aspect (70420 D). Gano Dunn. 6000 w. A I E E, Pro—May, 1916. Attitude of capital toward water powers.

STEAM ENGINEERING**Boiler Corrosion**

Water Power and Defense (70418 D). W. R. Whitney. 3500 w. A I E E, Pro—May, 1916. Importance in the development of fixed nitrogen.

Water Power Development and the Food Problem (70417 D). Allerton S. Cushman. 3500 w. A I E E, Pro—May, 1916. Its influence on the development of cheap fertilizer.

The Necessity for Water Power Development (71302 N). Henry J. Pierce. 9500 w. A El S—Apr. 27, 1916. Electrical possibilities for irrigation, railroads, and manufacturing.

Discussion of Power Estimates from Stream Flow and Rainfall Data (71116 B). Allen Hazen, Clemens Herschel, E. F. Chandler, C. H. Pierce, E. S. Glines, H. K. Barrows, and Dana M. Wood. 8000 w. B S C E, JI—June, 1916.

Water Powers on the Winnipeg River (71117). Ills. 2500 w. Cn E—June 15, 1916. Serial, 1st part. Possible commercial output.

Analysis of Merrill Report on Water-Power (71532). 3000 w. El W—July 1, 1916. Serial, 1st part. Shows errors and misleading and harmful tone.

Discussion on "Water Power and Defense" (Whitney), "The Water Power Situation, Including Its Financial Aspect" (Dunn), Washington, D. C., April 26, 1916 (71922 D). 21 pp. A I E E, Pro—July, 1916.

Water Powers of New Brunswick and Prince Edward Island (73766). K. H. Smith. Ills. 2500 w. Cn E—Oct. 5, 1916. Possibilities, with facts concerning actual development.

See also Power Developments, under CIVIL ENGINEERING, *Irrigation and Reclamation*.

STEAM ENGINEERING**Baffles**

Horizontal and Vertical Baffling (71166). S. H. Viall. Ills. 2500 w. Pwr—June 20, 1916. Comparison for boilers of the B & W type.

Balanced Draft

Operation of Boilers with Balanced Draft (73072). R. I. Elkin. 1800 w. El W—Sept. 9, 1916. Comparison of test results.

Blower

Small Centrifugal Blower of High Pressure (72743). Henry F. Schmidt. Ills. 5000 w. Pwr—Aug. 29, 1916. A turbine blower that ran at 60,000 r.p.m.

Boiler Code

Work of the Boiler Code Committee (67253 A). Ills. 4000 w. A S M E JI—

Jan., 1916. Gives 46 inquiries and replies.

The A. S. M. E. Code and the Massachusetts Rules—A Comparison (69724). Stanley P. Stewart. 3500 w. Pwr—April 18, 1916. Serial, 1st part. Chief points of difference.

Effect of the A. S. M. E. Boiler Code on Heating Boilers (69945 D). C. W. Obert. 2000 w. A S H V E, JI—April, 1916. Advantages.

Uniform Boiler Code (72367 A). W. H. P. Creighton. 1500 w. L E S, Pro—Aug., 1916. Statement concerning the A. S. M. E. code, with remarks by Prof. Jacobus.

Boiler Corrosion

The Internal Treatment of Boilers

Consult Classification of the Index. See page 7.

Boiler Design**STEAM ENGINEERING****Boiler Inspection**

(66797). George Anderson. 2000 w. Pwr—Dec. 28, 1915. Scale and prevention.

A Novel Method of Handling Boilers to Prevent Corrosion and Scale (66561 N). Allen H. Babcock. 24 pp. A S M E—Dec., 1915. Successful use of "Navy Standard Boiler Compound."

Boiler Corrosion (66928). John B. C. Kershaw. 3500 w. N E—Jan., 1916. Effects of salts in water.

Caustic Soda and Boiler Corrosion (68076). F. F. Vater. 2200 w. P E, C—Feb. 15, 1916. Excess may cause corrosion.

The Electrolytic Method of Preventing Corrosion (69848 N). Elliott Cumberland. Ills. 11 pp. Inst Met—March 29, 1916. Theory; method of protection.

Boiler Steel and Corrosion (69930). George L. Fowler. Ills. 1200 w. R A G April 28, 1916. Causes.

A Novel Method of Handling Boilers to Prevent Corrosion and Scale (71678 A). Allen H. Babcock. Synopsis of paper with discussion. 12500 w. A S M E, JI—July, 1916. Departure from conventional methods.

Boiler Corrosion by Magnesium Chloride (73952 A). James Scott. Ills. 1500 w. R E—Oct., 1916. Sources of magnesium chloride, effects on boilers, etc.

Boiler Design

The Steam Boiler of 1915 (65614). Arthur D. Pratt. Ills. Read at Engng. Cong., San Francisco. 8500 w. Power—Nov. 9, 1915. Design of boilers.

Some Elements of Smokeless Furnace Design (65814 D). Osborn Monnett. Ills. 2000 w. Ohio Soc Mech, Elec, & Steam Engrs, Jour—Vol. VIII. No. 1. Ways of improving settings from a smoke standpoint.

Design of Fire Tube Boilers and Steam Drums (66568 N). F. W. Dean. Ills. 3500 w. A S M E—Dec., 1915. Safety; construction and care.

Design of a Watertube Boiler (67276). C. W. R. Edichhoff. Ills. 1500 w. B M—Jan., 1916. Calculations.

Boiler Economy

Limiting Factors in Forcing Boilers Above Rating (65375). Theodore Maynz. Ills. 2800 w. Power—Nov. 2, 1915. Conditions that limit forcing and alterations in changing rating.

Circulation in Horizontal Water Tube Boilers (66574 N). Paul A. Bancel. Ills. 4000 w. A S M E—Dec., 1915. Conditions at loads up to 500 per cent.

Ueber die Wärmeübertragung von strömendem überhitztem Wasserdampf an Rohrwandungen und von Heizgasen an Wasserdampf (67707 B). R. Poensgen.

Ills. 3000 w. Z V d I—Jan. 8, 1916. Serial, 1st part. Experiments on the transfer of heat from flowing superheated steam to tube walls and from hot gases to steam.

Heat Transmission Through Boiler Tubes (67984 N). Henry Kreisinger and J. F. Barkley. Ills. 30 pp. U S B M—Tech. paper 114.

The Chemistry of Furnace Efficiency and Air Supply (67993 B). C. E. Lucke and E. D. Thurston, Jr. 1000 w. S M Q—July, 1915. Mathematical determination.

See Boilers under MARINE AND NAVAL ENGINEERING.

Boiler Explosions

Explosion of a Watertube Boiler (68952). Aug. Suzara. Ills. 700 w. B M—March, 1916. Rupture of bumped head, in Philippines.

Analysis of Boiler Explosion at West River, N. B. (70398). Ills. 1800 w. Pwr—May 16, 1916.

Boiler Explosion on Board Ship (70528 A). 2500 w. Eng—May 5, 1916. Investigation of explosion on La Marguerite.

Boiler Fuel

Boilers Heated by Coke-oven Gas (73110 A). Ills. 5000 w. I & C T R—Aug. 25, 1916. Serial, 1st part. The regenerative type of oven, the arrangements, method of burning gas, etc.

Boiler Furnaces

Strength of Boiler Furnaces (72833 N). John Airey. Ills. 16 pp. A S N E, JI—Aug., 1916. Part I. Comparison of the A. S. M. E. formula with other formulae. Part II. Investigation of a lap joint in cylinders subjected to external pressure.

The "Turbine" Furnace (72161 A). Ills. 2500 w. Enr—July 14, 1916. Description of the furnace and tests.

Boiler House

Boiler House Design and Operation (71707 A). W. W. Lackie. Abstract, with discussion. 6000 w. Eln—June 23, 1916. Design, equipment, fuel handling and storage.

Boiler-House Design and Operation (72402 A). W. W. Lackie. Read before the Inc. Mun. Elec. Assn. 4000 w. Eng—July 14, 1916. General design.

Boiler House Design and Operation (73295 A). W. W. Lackie. From a paper read before the Inc. Mun. Elec. Assn. 1200 w. Mch W—Sept. 8, 1916. Serial, 1st part. General survey of the modern boiler house.

Boiler Inspection

I. The Boiler Inspector and His Job. T. T. Ryan. II. Facilities and Methods of Working. W. J. Gillespie (66185 A).

Consult Classification of the Index. See page 7.

Boiler Joints

4000 w. R A G, M E—Dec., 1915. Prize article and one other.

Boiler Joints

Graphic Analysis of Riveted Boiler Joints (72183). Alphonse A. Adler. Ills. 2200 w. Pwr—Aug. 1, 1916. Method of analysis applied long ago by J. W. Schwedler to bridge structures.

Boiler Loads

Economical Load on Boilers (70687). Haylett O'Neill. 1300 w. Pwr—May 30, 1916. Calculations and curves from tests.

Boiler Operation

Sudden Cooling of Boilers in Cases of Low Water (65745). R. N. Blackburn. 3000 w. Power—Nov. 16, 1915. Defense of the statement that sudden cooling of overheated boiler plates is the safest practice.

Behavior of Boilers in Service (67538). J. C. McCabe. From paper before Detroit Engng. Soc. Ills. 5000 w. Pwr—Jan. 25, 1916. Causes and conditions which make trouble.

Verbrennung von Anthrasiten mit leicht schmelzbarer Asche aug "kalten Rost" (67718 B). Kirsch, translated by G. Blagowietschensky. Ills. 2500 w. Feuer—Jan. 1, 1916. Serial, 1st part. Experiments on burning anthracite on hollow grate bars, producing a light, fusible ash.

Economics of Stoker, Economizer and Superheater (68046). A. A. Potter and S. L. Simmering. 2000 w. El W—Feb. 12, 1916. Apparatus to improve operations.

The Running of Boiler Plants and National Economy (69878 A). D. Brownlie and H. Green. 2500 w. Eng—April 14, 1916. Serial, 1st part. Details of 100 typical plants.

Increasing Boiler Room Efficiency (69218). H. S. Knowlton. 3000 w. N E—April, 1916. Heat losses.

Steam Boiler Efficiency (69479). E. A. Uehling. 3500 w. P E, C—April 15, 1916. Influences that affect efficiency.

Draft in Fire-Tube Boilers (69435). S. H. Viall. Ills. 2000 w. Pwr—April 11, 1916. Study of arch construction, furnace temperatures, etc.

Action of Furnace Gases (69860). S. H. Viall. 2500 w. Pwr—April 25, 1916. Hand-fired furnace; importance of mixing gases with air.

Diagnostics of Steam Boiler Ailments (70400). J. C. McCabe. Ills. 4000 w. B M—May, 1916. Serial, 1st part. Causes and conditions tending to produce troubles.

Boiler Performances

Performance of Boilers with Balanced Draft (72455). R. J. Elkins. Ills. 1500 w. El W—Aug. 12, 1916. Serial, 1st

STEAM ENGINEERING**Boilers**

part Analysis of combustion conditions and boiler operation.

Boiler Plants

Moxley Plant Remodeled (66639). Thomas Wilson. Ills. 1400 w. Pwr—Dec. 21, 1915. Old and new installations compared.

Standard Oil Boiler Plants at Whiting (69433). Thomas Wilson. Ills. 3500 w. Pwr—April 11, 1916.

Methods for Handling Boilers in 100,000Kw. Station (69378). Ills. 2500 w. El W—April 8, 1916. L street station of Boston Edison station.

Philip Carey Boiler Plant (72470). Thomas Wilson. Ills. 1200 w. Pwr—Aug. 15, 1916. Steam generated at a very low rate.

Boiler Practice

Boiler Room Economies (68884 N). F. E. Matthews. Ills. 20 pp. A S R E JI—Mar., 1916. Heat transference and suggestions; with discussion.

Efficient Operation of Boiler Rooms (68720). Ills. 2500 w. P E, C—March 15, 1916. Improvements in stokers, draft control, feed water regulators.

The Series of Lectures Given to Firemen at Philadelphia Water Pumping Stations (68892). 3500 w. E & C—March 29, 1916. Theory and practice of combustion.

Boiler Problems

Some Boiler Problems and Their Solutions (71716 A). B. Thompson. 5000 w. Mch E—June 30, 1916. Serial, 1st part. Deals with Lancashire, 2-flue, and Cornish, single-flue boilers. Personal experience.

Boiler Regulator

Zug-und Temperaturregler für Heizrohrkessel von C. W. Schulz (67702 B). Rudolph and Hanebuth. Ills. 1600 w. Z V d I—Dec. 11, 1915. Schulz regulator for draft and temperature on fire-tube boiler.

Boilers

See also Marine Boilers, under *Steam Engineering*.

The Boiler of 1915 (68546 N). Arthur D. Pratt. Ills. 44 pp. Discussion also. Int Eng Cong, Trans—Paper 126. Review.

The Management of Steam Boilers (70744 A). Ernest Pull. 4000 w. E Rv—May 15, 1916. Detailed directions.

On the Transmission of Heat in Boilers (72662 A). E. R. Hedrick and E. A. Fessenden, with discussion. 7 pp. A S M E, JI—Aug., 1916. Outlines a new theory which agrees with experiments.

Boiler Development, 1882-1916 (73481 A). D. Wilson. 3300 w. Eln—Sept. 15, 1916. Remarkable progress.

Consult Classification of the Index. See page 7.

Boiler Settings

The Graphic Determination of Working Pressure of Boiler Shells (73124). John S. Watts. Charts. 1200 w. B M—Sept., 1916. Use of chart for finding allowable pressure on boiler, or thickness of shell plate.

Largest Boilers for Ford Co. (73676). John P. Badenhausen. Ills. 1500 w. Pwr—Oct. 3, 1916. Largest boilers ever installed in United States.

Boiler Settings

Boiler Settings for Smokeless Combustion (72664 A). Osborn Monnett. Ills 4 pp. A S M E, JI—Aug., 1916. Includes latest form of double arch bridge wall furnace.

Boiler Tests

Acceptance Tests of B. & W. and Stirling Boilers (67919). L. A. Quayle. Ills. 2000 w. Pwr—Feb. 8, 1916. Guarantees exceeded.

Calculations of a Boiler Trial Based on Data Sheets (67831). Frederick L. Ray. 3000 w. N E—Feb., 1916. Details; method of tabulating results.

Vergelijkende proeven met een Yarrow-waterpijpketel en een Normand-waterpijpketel (68855 B). K. F. Koning. Ills. 5000 w. Ing—Feb. 26, 1916. Comparative tests on Yarrow and Normand watertube boilers; with discussion.

Tests of Hand-Fired Furnaces (69031). S. H. Viall. Ills. 2000 w. Pwr—March 21, 1916. Study of effect of arch construction.

See *Measurement*.

Boiler Tubes

Recrystallization as a Factor in the Failure of Boiler Tubes (71454 N). A. E. White and H. F. Wood. Ills. 30 pp. A S T M—June, 1916. Failure investi-

Chimneys

Proportioning Chimneys on a Gas Basis (66578 N). A. L. Menzin. 20 pp. A S M E—Dec., 1915. Baffling for improving boiler performance and efforts to improve efficiency of combustion.

Coal Purchasing

Some Technical Aspects of the New York Specifications (65322). Reginald Trautschold. 2000 w. Coal Age—Oct. 30, 1915. Critical discussion of requirements.

Coke Fuel

Coke as a Boiler Fuel (67659 A). E. W. L. Nicol. Ills. 1000 w. El R—Jan. 14, 1916. Adopting chain grate to burn coke.

Coke Fuel for Steam Boilers (69870 A). E. W. L. Nicol. 3300 w. Mch E—April 14, 1916. Methods of burning, influence on efficiency.

STEAM ENGINEERING**Condensers****Combined Plants**

Making the Steam Plant Adequate for Both Power and Heating (72053 A). Charles L. Hubbard. 2500 w. E M—Aug., 1916. How to design a combined plant.

Operating Costs in Combined Power and Heating Plants (72852 A). Charles L. Hubbard. Ills. 4000 w. E M—Sept., 1916. Third paper considers how to determine steam costs.

Combustion

The Firing and Combustion of Soft Coal Under Naval Boilers (71045 N). Wm. L. De Baufre. Ills. 4000 w. A S N E, JI—May, 1916. Testing coals for naval service.

Practical Chemistry of Combustion (70387 A). A. G. Kinyon, with discussion. 6500 w. S & S-W R C, Pro—Jan., 1916.

See also Stacks under **CIVIL ENGINEERING, Construction**.

Combustion Improvers

Fuel-Combustion Improvers (66371). 2000 w. Cl A—Dec. 11, 1915. Mechanical and chemical processes.

Compound Engines

Proportioning Cylinder Ratio in Compound Engines (70554). R. L. Wales. 1200 w. Pwr—May 23, 1916. Suggested improvement in present method.

Condensation

The Condensation of Steam (70476 A). R. M. Neilson. 1500 w. Mch W—May 5, 1916. Serial, 1st part. Pressures, relation to temperature, air-steam mixtures.

Condensers

Interpretations of Data on Steam-Condenser Performance (65714). H. A. Cozens, Jr. 1500 w. Elec Wld—Nov. 13, 1915. Formulas and calculations convenient for checking operation.

Barometric Condenser Drain (65863). H. R. Bissell. Ills. 1200 w. Coal Age—Nov. 20, 1915. Practical method of draining a water pocket in piping carrying steam under 23 in. of vacuum.

Cleaning Condenser Tubes (70397). C. F. Hirshfeld. Ills. 3000 w. Pwr—May 16, 1916. Gain by keeping clean; methods.

The Action of Air in Surface Condensers (70994). Paul A. Bancel. Ills. 1800 w. Pwr—June 13, 1916. Influence of various factors.

Factor That Influence the Selection of a Condenser (72971). H. J. Macintire. 2500 w. Pwr—Sept. 5, 1916. Important factors controlling selection.

See also same heading under **RAILWAY ENGINEERING, Motive Power and Equipment**.

Consult Classification of the Index. See page 7.

Condenser Tubes

STEAM ENGINEERING

Feed Water

Condenser Tubes

An Investigation Leading to Specifications for Condenser Tubes (71456 N). A. E. White. Ills. 16 pp. A S T M—June, 1916. Explains cause of splitting, and remedy.

Condensing

Surface, Jet and Evaporative Condensers (66315 N). Maurice Moore. 2000 w. C w E—Nov., 1915. Suitability of each, and method of operation.

Performance and Design of High Vacuum Surface Condensers (66573 N). George H. Gibson and Paul A. Bancel. Curves. 33 pp. A S M E—Dec., 1915.

Action of Air in Surface Condensers (68447). C. F. Hirshfeld. Ills. 3000 w. Pwr—Feb. 29, 1916. Shows phenomena graphically.

Notes on Surface Condensers (69156). A. B. Clark. 1000 w. Pwr—March 28, 1916. Temperature head defined; conditions affecting vacuum.

See Pumps under *Hydraulic Machinery*.

Cooling Towers

The Theory of Cooling Towers Compared with Results in Practice (71191 B). B. H. Coffey and George A. Horne. Ills. Also discussion. 9000 w. A S R E, JI—May, 1916. The 1915 operations.

Cooling Water

Cooling Condensing Water by Wholesale (66400). Walter B. Snow. Ills. 500 w. Pe, C—Dec. 15, 1915. Fall River plans.

Costs

Boiler-Room Cost Curves (71573). J. D. Morgan. 800 w. Pwr—July 4, 1916. Curves showing how different items influence cost of steam.

Draft

Draft in Furnaces and Flues (65610). E. G. Bailey. Ills. 4000 w. (Power—Nov. 9, 1915. Why there is less draft at some points beyond the furnace than in the furnace.

What Draft Gages Tell (66800). M. K. Bryan. Ills. 1700 w. Pwr—Dec. 28, 1915. Effects of dampers.

Draft Gages

Draft-Gages on Oil-Burning Boilers (67651). F. H. Rosencrants. Ills. 1200 w. Pwr—Feb. 1, 1916. Ways of connecting.

Economizers

"Economizer Equation" (67511 A). Albert W. Smith. Diagrams. 1500 w. S JI E—Jan., 1916. Derives equation and puts solution of problems into diagrams. Renewing Economizer Tubes (67917). Charles H. Bromley. Ills. 800 w. Pwr—Feb. 8, 1916. Methods.

Economizer Safety and Repairs (69434). S. H. Farnsworth. Ills. 600 w.

Pwr—April 11, 1916. Methods of operation and handy repairs.

Efficiency

Efficiency in the Boiler Room (72588). Joseph Harrington. 3000 w. Pwr—Aug. 22, 1916. Analyzing boiler and furnace performance.

Engine Efficiency

Steam Engine Efficiency (66931). Charles L. Hubbard. 2500 w. N E—Jan., 1916. Serial, 1st part. Thermal and mechanical efficiencies; how affected by conditions.

Engines

Small Engines in the Steam Plant (73571 A). Robert L. Streeter. Ills. 4000 w. E M—Oct., 1916. Factors which govern adaptability, cost, and economy.

Large Engines in the Steam Plant (74157 A). Robert L. Streeter. Ills. 3500 w. E M—Nov., 1916. Characteristics between large and small engines, with study of the Corliss, the poppet-valve, and the Stumpf uniflow types.

Evaporators

Capacity and Economy of Multiple Evaporators (71679 A). E. W. Kerr. Synopsis of paper, with discussion. 10000 w. A S M E, JI—July, 1916. Results of recent experiments.

Exhaust Steam

The Utilization of Exhaust Steam (65330). O. Bechstein. Abstract from *Prometheus*. Ills. 1000 w. Sci Am Sup—Oct. 30, 1915. Systems for promoting economy of fuel.

Feed Pumps

Boiler Feed Pumps (68951). G. M. Kohler. Ills. 2000 w. B M—March, 1916. Types available.

Feed Water

Neutralizing and Softening Mine Drainage Water (66001). J. R. Campbell. Ills. 2200 w. Coal Age—Nov. 27, 1915. Treated with lime and soda-ash.

Ueber Verwendung von Dampfturbinenkondensat zum Speisen von Dampfkesseln (67729 B). M. R. Schulz. 2200 w. Z g T—Dec. 30, 1915. Notes on using turbine condensate for boiler feed.

Filtration of Softened Water (70255). F. F. Vater. 1600 w. Pwr—May 9, 1916.

Water Softening Plants (70558 A). H. V. A. Briscoe and R. Stevenson. Ills. 5500 w. C E M—May, 1916. Principles, and methods of applying.

The Water Softener and Boiler Feed Water (71200). H. R. Dorman. 2000 w. Wis E—May, 1916. Principle of chemical precipitation.

Impure Boiler Water (70815). William N. Berkeley. 1500 w. Pwr—June 6, 1916. Treatment of boiler waters, especially from rivers.

Consult Classification of the Index. See page 7.

Feed Water Heaters

The Effects of Dissolved Salts in Feed Water (71414). John B. C. Kershaw. 2500 w. Pwr—June 27, 1916. Explains why salts accelerate corrosion.

Feed-Water Heaters

Economic Limit of Feed-Water Heating Surface (67537). F. H. Rosenkrants. 1200 w. Pwr—Jan. 25, 1916. Furnishing plant with nearest correct amount for conditions of excess and insufficient exhaust steam.

Flue Gases

How Much CO₂ to Expect (65908). Victor J. Azbe. 1500 w. Power—Nov. 23, 1915. Maximum percentages of CO₂ obtainable with various kinds of fuel.

Sampling and Analyzing Flue Gases (67372 N). Henry Kreisinger and F. K. Ovitz. Ills. 60 pp. U S B M—Bul. 97. Information on methods and on utilization of analyses.

Fuel Economy

More Steam from Less Coal (73572 A). F. D. Harger. Ills. 4500 w. E M—Oct., 1916. Determination of economical fuel consumption.

British Association for the Advancement of Science. Report of the Fuel Economy Committee (73703 A). 12000 w. C G—Sept. 15, 1916. Serial, 1st part. Preliminary report, with discussion on coal saving.

See also RAILWAY ENGINEERING, *Motive Power and Equipment*.

Fuel Purchasing

Selecting and Buying Fuel (71246 N). W. H. Grady, with discussion. 4500 w. A W P A—Jan., 1916. Methods of finding most desirable fuel for a plant.

Fuels

Mischungsverbrennung (65409 B). A. Dosch. Ills. 1500 w. Feuer—Oct. 1, 1915. Serial, 1st part. Investigation of methods and results of burning hard and soft coal together.

Fuel Economy (66108 A). W. A. Bone. 4000 w. C G—Nov. 19, 1915. National importance. (Abstract.)

Notes on the Use of Low-Grade Fuel in Europe (66359). R. H. Fernald. Ills. 30 pp. U S B M—Tech paper 123. Investigation, incomplete because of war.

Relative Costs of Coal and of Oil Fuels (66431). F. C. Fearing. 1200 w. Pwr—Dec. 14, 1915. Chart showing relative costs, with explanatory notes.

The Cheapest Fuel and Most Economical Load (66171). Robert H. Karl. 1500 w. Pwr—Dec. 7, 1915. Tests on burning screenings and nut coal.

Selecting and Buying Fuel (67465 N). W. H. Grady. 3000 w. A W P A—Jan., 1916. Methods for determining most economical fuel.

STEAM ENGINEERING

Governors

Fuel Values (67932 A). J. H. Pater-son. Read before Soc. of Chem. Ind. 1500 w. C G—Jan. 21, 1916. Comparison of all types.

Coking and Caking Coal (69154). S. H. Viall. 2000 w. Pwr—March 28, 1916. Terms defined. Characteristics.

Burning Anthracite and Other "Dry" Fuel in Boilers (69871 A). Walter J. May. 1200 w. Mch W—April 14, 1916. Suggestions.

Burning Coke Breeze (71568). Ills. 1500 w. Pwr—July 4, 1916. System for burning this kind of fuel.

Substitutes for Coal in the Andes (71121). Benjamin L. Miller and Joseph T. Singewald, Jr. Ills. 4500 w. Cl A—June 17, 1916. Yareta plant and other fuels.

Furnaces

La teoria di Groume-Grjmaillo sui forn i a fiamma (65426 B). Umberto Savoia. 19 pp. Coll Ing Ar Att—Aug., 1915. Explanation of the Groume-Grjmaillo theory on the nature of flames in furnaces.

Neuerungen an Feuerungsanlagen für feste Brennstoffe (67719 B). Pradel. Ills. 4800 w. Feuer—Jan. 1, 1916. Regular quarterly review of novelties in furnace appliances for solid fuels.

Efficient-Operation of Boiler Rooms (68075). Ills. 2200 w. P E, C—Feb. 15, 1916. Special furnace for mixed coal.

Steam Chart (68077). P. M. Gallo. Chart. 3500 w. P E, C—Feb. 15, 1916. For solving steam and water piping problems.

Neuerungen an Feuerungsanlagen für feste Brennstoffe (70116 B). Pradel. Ills. 3000 w. Feuer—April 15, 1916. Quarterly review of new appliances for boilers.

The Burning of Offals Such as Sawdust, Kindling, Tanbark, etc. (72179). Judson Pratt. Read before Ohio Convention, at Dayton. 4000 w. N E—Aug., 1916. Special furnaces used.

Gas Explosions

Gas Explosions in Boilers (65613). Reginald Trautschold. 3000 w. Power—Nov. 9, 1915. Cause and prevention.

Gas Fuel

Theory and Design of the Blast Burner Injector (68902). William C. Buell, Jr. Ills. 3500 w. G A—March 15, 1916. Investigation of most efficient burner for industrial operations.

Governors

Electrically Controlled Engine Stops and Speed Limit Governors (72066 A). 2000 w. Sf E—July, 1916. Outlines rules and requirements of N. J. Dept. of Labor.

Engine Governors (72187). E. C. Wells. Ills. 1800 w. P E, C—Aug. 1,

Consult Classification of the Index. See page 7.

Heat Conduction

1916. Serial, 1st part. Fundamental principles for speed control.

Governor Calculations and Diagrams (73117 A). Fairfax. 1500 w. Mch W—Sept. 1, 1916. Serial, 1st part. Explains graphic methods.

Heat Conduction

Heat Conduction and the Engineer (73046 A). R. W. King. 2500 w. S JI E—Aug., 1916. Outlines the history of the Fournier series and reviews their application to engineering projects.

Heat Transmission

Heat Transmission Through Boiler Tubes (68777 A). F. G. Baender. Ills. 1200 w. S JI E—March, 1916. Reviews Technical paper 114 (U S B M), with additional data.

High Pressures

Higher Steam Pressures (66567 N). Robert Cramer. 15 pp. A S M E—Dec., 1915. Possibility of improving economy of engines.

Inspection

Inter-Boiler Inspection (73123). J. C. Hawkins. 2000 w. Pwr—Sept. 12, 1916. Outline of procedure.

Losses

Furnace and Boiler Losses (71693). R. Cedarblom. Ills. 2000 w. Pwr—July 11, 1916. Forty years progress in steam generation discussed.

Lubrication

Engine - Room Lubrication (71412). George A. Townsend. 2500 w. Pwr—June 27, 1916. Operation and maintenance costs when lubricated by different methods.

Marine Boilers

Test of Ward Boiler (71049 N). S. M. Robinson. Ills. 1800 w. A S N E, JI—May, 1916. Tests and results.

Oil Burning

See same heading under MARINE AND NAVAL ENGINEERING.

Oil Fuel

Oil Fuel (69659 N). Ernest Peabody. Ills. 131 pp. Int Eng Cong Trans—1915. Use and burners.

Peat Fuel

Die Wirtschaftlichkeit des Torf-Dampf-kesselbetriebes (68806 B). A. H. W. Hellemans. Ills. 2200 w. Feuer—Feb. 15, 1916. Proper design and operation of boilers for burning peat fuel.

Performance

Conditions Governing Operation of Prime Movers (66378). A. A. Potter and S. L. Simmering. Effects from changes in steam pressure, superheat and vacuum.

Pipe Drainage

Draining High-Pressure Steam Piping (65376). Charles L. Hubbard. Ills.

STEAM ENGINEERING**Power Plants**

2000 w. Power—Nov. 2, 1915. Requirements of drainage systems.

Piping

Boiler Feed Piping (65737). From *The Locomotive*. Ills. 3500 w. Boiler Maker—Nov., 1915. Arrangement of the internal and external feed piping.

Powdered Coal

Utilizing Powdered Coal at Lebanon, Pa. (70715). Ills. 900 w. I A—June 1, 1916. Waste-heat boilers used with open-hearth furnaces.

Powdered Coal Burning (71908 A). Ills. 800 w. I A—July 20, 1916. Plant at Middletown, Pa.

Pulverized-Fuel Installation Serving Ten 250-H.P. O'Brien Boilers (73752 A). H. G. Barnhurst. 2000 w. A S M E, JI—Oct., 1916. Detailed description.

The Use of Powdered Coal as Fuel (73751 A). Joseph Harrington. 4000 w. A S M E, JI—Oct., 1916. Methods in the production, handling and firing, and advantages with certain furnaces.

Power-Plant Operation

Union Central Building Power Plant Tests (68073). C. B. Garrison. Ills. 1500 w. Pwr—Feb. 15, 1916. Tests for efficient operation.

Power Plants

Unusual Features in Factory Plant (65350). Ills. 1800 w. Prac Engr, Chicago—Nov. 1, 1915. Plant at Kimberly, Wis.

Construction and Operation of a Small Steam Plant (67072). Glenville A. Collins. Ills. 1800 w. El W—Jan. 29, 1916. Plant on Vashon Island furnishing energy to small communities and to about 25 industrial plants.

Rochester State Hospital Plant (67916). Thomas Wilson. Ills. 2000 w. Pwr—Feb. 8, 1916. New plant effected saving in fuel of \$15,000 the first year.

Remodeling Power Plants (68431). H. Hamkens. Ills. 2500 w. N E—March, 1916. Constructional features of various systems.

Remington Arms & Ammunition Company's Power Plant (68591). Warren O. Rogers. Ills. 2500 w. Pwr—March 7, 1916. Steam-turbine plant rapidly erected.

Power Plant at Mooseheart (69152). Thomas Wilson. Ills. 2000 w. Pwr—March 28, 1916. Small well-equipped plant.

Records at the Blackstone (69725). W. A. Eberman. 2500 w. Pwr—April 18, 1916. Equipment, operating conditions, records showing variation.

Recent Changes at Western Electric Power Plant (69189). Ills. 2500 w. P E, C—April 1, 1916. Turbines and equipment at Hawthorne, Ill.

Consult Classification of the Index. See page 7.

Prime Movers

Steam Requirements for Power and Heating (71349 A). Chas. L. Hubbard. 4500 w. E M—July, 1916. Formulae and data for combined plants.

See also **ELECTRICAL ENGINEERING**, *Generating Stations*, and Power Plants, under **MINING AND METALLURGY**, *Mine Operation*.

Prime Movers

Efficiencies of Steam Prime Movers (70987 A). F. O. Ellenwood. 4000 w. S J I E—June, 1916. Various meanings given the same term and opinion as to which seem most satisfactory.

Pulverized Coal

See **RAILWAY ENGINEERING**, *Motive Power and Equipment*.

Pulverized Fuel

Stand der Kohlenstaubfeuerungen in Deutschland (66226 B). A. B. Helbig. Ills. 2000 w. St u E—Nov. 18, 1916. Review of German development of coal-dust firing.

Stationary Boilers Fired by Pulverized Coal on the Missouri, Kansas & Texas (73545). Ills. 1500 w. R A G—Sept. 29, 1916. Heine type of horizontal boilers.

Receivers

Receivers (70772). R. A. Cultra. Ills. 2500 w. N E—June, 1916. Location on different types of engines, their purpose, care and operation.

Recorders

Recording Instruments for the Boiler House (69032). F. J. Denk. Ills. 1800 w. Pwr—March 21, 1916. Method of boiler control.

Regulators

Ellis Automatic Boiler Feed Regulators (72303 N). J. N. Ellis. Ills. 2000 w. Cw E—July 1, 1916. An Australian invention. Method of operation.

Revolving Pistons

Dreizylindrige Kraftmaschine mit unlaufenden Kolben (67767 B). Karl Rizor. Ills. 1500 w. G A G B—Jan. 15, 1916. Steam engine with three revolving pistons, applications.

Safety Valves

Steam Safety Valves (70224 B). George H. Clark. Ills. 7500 w. A S M E, JI—May, 1916. Principles of operation, with new design.

A New Type of Steam Safety Valve (72146 B). George H. Clark, with discussion. Ills. 2500 w. A S R E—July, 1916. Details of design.

Smoke

Recent Progress in Boiler Installations and Some Results of Furnace Investigations (66454 A). William A. Hoffman. Ills. 4000 w. A E S—Nov., 1915. Best construction.

Smoke Abatement—A Report on Re-

STEAM ENGINEERING

Steam Accumulators

cent Investigations Made at Washington University (66453 A). Ernest L. Ohle. Ills. 2500 w. A E S—Nov., 1915. Possible economy.

Why a Public Utility Steam Power Plant Should Not Have a Smoke Stack, and How to Prevent Smoke (69003). 4000 w. El T—March, 1916. Serial, 1st part.

Smoke Abatement

Smoke Abatement at a Dayton Power Plant (72026). Charles C. Moore. Ills. 600 w. Pwr—July 25, 1916. Methods that resulted in large reduction of heavy, black smoke.

Burning 'Soft Coal Without Smoke; Also Combustion of Coals in General (73979). Frederick T. Oakes. Ills. 1200 w. H & V M—Oct., 1916. Essentials for burning without smoke and results obtained by certain methods.

The Development of the Smokeless Boiler (73978). Charles L. Collette. Ills. 1500 w. H & V M—Oct., 1916. High efficiencies of this type.

The Relation of Stokers to Smoke Abatement (73667). Joseph G. Worker. Ills. 4000 w. El JI—Oct., 1916. Types of stokers and applications for which they are suited.

See *Furnace under Heating and Cooling*.

Smoke Prevention

Smoke Prevention Codes for Large and Small Cities (73980). 2200 w. H & V M—Oct., 1916. Typical ordinance.

See **RAILWAY ENGINEERING**, *Motive Power and Equipment*.

"Soot"

"Soot"—Its Composition, Its Effect on Boiler Efficiency, Its Removal by Mechanical Soot Cleaners (65817 D). F. A. Moreland. 4000 w. Ohio Soc Mech, Elec, & Steam Engrs, Jour—Vol. VIII. No. 1. The use of such cleaners and precautions necessary.

Soot Blowers

Soot Blowers (73627). Ills. 2000 w. P E, C—Oct. 1, 1916. Advantages and operating methods.

Stacks

Power-House Chimney Design for Bituminous Coal (67874). Reginald Traut-schold. 2500 w. Cl A—Feb., 1916. Requirements to secure draft.

Selection of Stacks and Breeching (68446). William Wippermann. Chart. 2500 w. Pwr—Feb. 29, 1916. Method of proportioning.

Steam Accumulators

Betriebserfahrungen mit Dampfspeichern (65478 B). Ills. 5000 w. Glck—Oct. 23, 1915. Results of operation with

Consult Classification of the Index. See page 7.

Steam Charts

steam accumulators at a number of plants.

Steam Charts

The Ellenwood Steam Charts (70036 A). C. Harold Berry. Charts. 5000 w. S J I E—May, 1916. Their applications.

Steam Flow

Investigation of the Pressure Drop in Steam Pipes (68719). M. Guillaume. Abstract translation. Ills. 3000 w. P E, C—March 15, 1916. Serial, 1st part.

Steam Plants

Steam Plant Efficiency (69586 A). Vernon Smith. Abstract of paper before the S. Wales Inst. of Engrs. 8000 w. Mch E—March 31, 1916. Points requiring personal supervision of engineer.

Power Equipment for Steam Plants (72853 A). Robert L. Streeter. Ills. 7000 w. E M—Sept., 1916. This first article of a series gives data on turbines. Factors Governing the Efficiency of Steam Plants (73608). Charles E. Bowron. 2200 w. Cl A—Sept. 30, 1916. Resume of many governing considerations.

Steam Traps

The Rolling Ball Trap (65816 D). C. S. Brown and A. A. Cryer. Ills. 3000 w. Ohio Soc Mech, Elec, & Steam Engrs, Jour—Vol. VIII. No. 1. The requirements of steam traps and description of device named.

Testing of Steam Traps at the U. S. Naval Engineering Experiment Station, Annapolis, Md. (68959 N). J. L. Kauffman. Ills. 1500 w. A S N E, JI—Feb., 1916. Manner of conducting tests.

Kinds and Uses of Steam Traps (71694). Ills. 2000 w. Pwr—July 11, 1916. Characteristics of various classes.

Stokers

Blower Installations and Air Ducts (66049). R. A. Langworthy. Ills. 2200 w. P E, C—Dec. 1, 1915. Arrangements for forced draft stokers.

Stoking

Stoking Small Anthracite Coal (73938). Warren O. Rogers. Ills. 1000 w. Pwr—Oct. 17, 1916. Method of firing without shoveling into furnace.

Superheaters

Modern Superheater and Its Performance (71521). S. S. Riegel, with discussion. 7000 w. R A G—June 30, 1916. Read before East. Ry. Club. Recent improvements; economy; efficiency, etc.

Practical Points on Modern Superheating (71901 A). W. H. Maxwell. 3000 w. C E M—July, 1916.

Modern Superheater (73337 A). W. H. Maxwell. Ills. 3000 w. C E M—Sept., 1916. Types described.

Superheating

Superheated Steam (66046). A. E.

STEAM ENGINEERING

Turbines

Monia. 2500 w. N E—Dec., 1915. Characteristics and use.

High Pressure Steam for Superheating (66798). 1700 w. Pwr—Dec. 28, 1915. Proposes small independent boiler.

How to Use Superheated Steam (69956 A). Charles L. Hubbard. Ills. 4500 w. E M—May, 1916. General survey.

How to Use Superheated Steam (70611 A). Charles L. Hubbard. 3000 w. E M—June, 1916. Second article explaining theory and practice.

Surface Combustion

Some Recent Experiments in Surface Combustion (66169). L. J. Bradford and C. D. Corwin. Ills. 1000 w. Pwr—Dec. 7, 1915. Serial, 1st part. Summary of literature and history.

Traveling Screens

Traveling Screens at Northwest (70395). Thomas Wilson. Ills. 1200 w. Pwr—May 16, 1916. Equipment for straining condenser and boiler feed water in a large station.

Turbines

See same heading under MARINE and NAVAL ENGINEERING, and Waste Heat, under *Combustion Engines*.

Steam Turbine Operation (65398). Frederick L. Ray. Ills. 2000 w. Natl Engr—Nov., 1915. Instructions and precautions.

Das Wesen der Abdampf- und der Zwischenampferwertung sowie deren Einfluss auf die Verbilligung der Stromerzeugung (65442 B). Ernst Blau. 2000 w. E u M—Oct. 17, 1915. Results obtained in reducing cost of electricity by use of exhaust and low-pressure steam.

Turbines vs. Engines in Units of Small Capacities (66557 N). J. S. Barstow. 4500 w. A S M E—Dec., 1915. Fields of each.

Note on the Effect of Vacuum in Steam-Turbines (66074 A). Gerald Stoney. 1500 w. Eng—Nov. 19, 1915. Investigations.

Les progrès récents dans les moteurs a vapeur (67035 B). A. Foillard. Ills. 2600 w. G C—Jan. 1, 1916. Review of progress in steam-prime-mover design, especially turbines with double rotation.

The 1915 Steam Turbine (68544N) E. A. Forsberg. 17pp. Int. Eng. Cong, Trans-Paper 124. Early development in Sweden and the two firms representing the industry.

Beiträge zur Strömungslehre mit besonderer Berücksichtigung der Mischungsvorgänge (67773 B). G. Zerko-witz. Ills. 2200 w. Z g T—Jan. 20, 1916. Discussion of theory of steam flow, especially as regards mixing phenomena of steam.

Ash Conveyors

Small High-Speed Steam Turbines (67626). H. D. Storer, Ills. 1800 w. El JI—Feb., 1916. Requisites; reduction gear.

The Development of the Construction of Turbines in the Netherlands (68543 N). D. Dresden. Ills. 10 pp. Int Eng Cong, Trans—Paper 123. General treatment.

Steam Turbine Blade Fastenings (68956 N). Jas. A. Capstaff. Ills. 900 w. A S N E, JI—Feb., 1916. Results of tests.

Performance of 30000 Kw. Steam Turbo-Generators (70368). Ills. 1500 w. El W—May 13, 1916. Tests in N. Y. City.

The Exhaust Steam Turbine (70816). J. Breslav. Ills. 2500 w. Pwr—June 6, 1916. Merits of low- and mixed-pressure turbines.

Performances of Uniflow Engine and Turbine Compared (70818). L. A. Quayle. 1200 w. Pwr—June 6, 1916. An investigation to determine which type would furnish light and power more economically.

Report Upon Efficiency Tests of a 30000 kw. Cross-Compound Steam Turbine (70820 A). H. G. Stott and W. S. Findlay, Jr. With discussion. 9800 w. A S M E, JI—June, 1916. At New York local section meeting.

Recent Advances in Large Steam Turbine Practice (70647). J. F. Johnson. Ills. 3300 w. El JI—June, 1916. Increase in capacity, reliability and efficiency.

A Small Turbine for Direct Connection or Gearing (70712 A). Richard H. Rice. Ills. 700 w. G E R—June, 1916. Type L turbine unit and its uses and capacity.

The Steam Flow Into a Compound Steam-Turbine (72007 A). 2500 w. Eng—July 7, 1916. Results of experiments.

The Steam Turbine on Board Ship (71601 A). Ills. 1500 w. I Mr E—July, 1916. Application of De Laval speed reducing gears to turbine drive.

Turbine Tests (71483). Henry A. Cozens, Jr. 1000 w. N E—July, 1916. Two general methods of standardizing tests.

TRANSPORTING AND CONVEYING**Belt Conveyors**

Turbines (73963 N). M. I. Nusim. 10 pp. A I S E E—June, 1916. Principles on which turbines are based, with review of types.

Turbo-Generators

Temperature Variations in the Turbine Steam Plant (69030). Plate. 700 w. Pwr—March 21 1916. Average approximate temperatures at different points.

Uniflow Engines

Discussion on the High Pressure Uniflow Engine (69426 A). C. Harold Berry. 800 w. S J I E—April, 1916. Errors in articles by Robert Cramer.

Uniflow Engine for Rod Mill (71907 A). O. J. Abell. Ills. 800 w. I A—July 20, 1916. Installation at Youngstown.

Valve Diagrams

Ermittlung eines genauen Diagramms der Kreuzkopfauslenkungen bei Kurbelgetrieben (74218 B). H. Andresen. Ills. 1600 w. S B—Sept. 16, 1916. New diagrams showing valve motion in relation to position of crank.

Valve-Gears

Practical Notes on the Adjusting and Setting of Valve-Gears (70475 A). Ills. 1000 w. Mch W—May 5, 1916. Suggestions.

Nonreturn Stop Valves (67321). Ills. 3500 w. Pwr—Jan. 18, 1916. Serial, 1st part. Various types to prevent dangerous escape of steam.

Valves

Blowoff Valves and Systems (71488). Ills. 2200 w. P E, C—July 1, 1916. Selecting and installing.

Blow-Off Connections (71486). R. T. Strohm. Ills. 1500 w. N E—July, 1916. Proper and improper arrangements.

Valve Testing

Testing Safety Valves at the Naval Engineering Experiment Station (70996). J. L. Kauffman. Ills. 2500 w. Pwr—June 13, 1916. Extracts from specifications of the U. S. Navy.

Waste Heat

How to Utilize Waste Heat Boilers (66734). C. J. Bacon. Read before Am. Ir. & St. Inst. Ills. 4000 w. I T R—Dec. 23, 1915. Problems and results.

Novel Industrial Power Plant (66043). Ills. 1500 w. N E—Dec., 1915. Waste heat of malleable iron furnaces utilized by boilers in Auburn, N. Y.

TRANSPORTING AND CONVEYING**Ash Conveyors**

Ash, Clinker, and Dust Separators (71003 A). M. Buhle, in *Glückauf*. Ills. 1000 w. C G—May 26, 1916. Schwabach ash conveyor.

Belt Conveyors

Belt Conveyors (69862 N). A. Robertson and A. McArthur Johnston; also discussion. Ills. 10,000 w. S A I E, JI—March, 1916. Complete discussion.

Consult Classification of the Index. See page 7.

Cableways

TRANSPORTING AND CONVEYING

Derricks

Cableways

Sull'esercizio e manutenzione delle funicolari aeree (66228 B). Emilio Noe. 3000 w. M T—Nov. 10, 1915. Brief exposition of methods of building and operating aerial tramways.

Sellbahnlaufwerk mit Kupplung durch Eigen und Schlaggewicht (67047 B). G. W. Heinold. Ills. 2600 w. Z V d I—Dec. 25, 1915. New carriage for wire ropeway having grip actuated both by its own weight and by impact.

Aerial Cableway at Niagara Falls, Ont. (67490). Ills. 3500 w. Cn E—Jan. 20, 1916. Torres system for taking tourists over the whirlpool.

Car Dumpers

Car Dumpers in Water Shipping (70098). Scott W. Linn. Ills. 3000 w. Cl A—May 6, 1916. Plants and their accessories.

Car Dumping

The Design of Plants for Dumping Coal Cars (70912). J. F. Springer. Ills. 1000 w. R A G—June 9, 1916. Speed, efficiency and safety govern arrangement.

Coal Handling

Modern Coal and Coke Handling Machinery: As Used in the Manufacture of Gas (69654 A). J. E. Lister. Ills. 24 pp. S E—April 3, 1916. General discussion.

Handling Retail Coal in a Concrete Cylinder Plant (69778). Charles H. Higgins. Ills. 1800 w. E N—April 20, 1916. Perry Coal Co., N. Y. City.

Coal Handling in a Small Plant (70661). R. A. Langworthy. Ills. 2000 w. P E, C—June 1, 1916. Inexpensive appliances.

Coal Transfer and Preparation Plant of the East Broad Top R. R. & Coal Co. (70682). Ills. 1200 w. R R—May 27, 1916. Plant at Mt. Union, Pa.

Handling Coal and Ashes at Northwest Station (70688). Thomas Wilson. Ills. 1200 w. Pwr—May 30, 1916. Unusually complete system.

Handling Coal in the Victor Plant (71023). Henry J. Edsal. Ills. 3000 w. P E, C—June 15, 1916. Unusually complete system at Camden, N. J.

Handling Coal in Large Boiler Houses (72706). H. V. Shifer. Ills. 1300 w. Cl A—Aug. 26, 1916. Methods.

See also Material Handling, under *Transporting and Conveying*.

Coal Storage

See same heading under RAILWAY ENGINEERING, *Motive Power and Equipment*.

Conveyors

The Use of Belt Conveyors (71539). Excerpt from article by A. Robertson and A. McA. Johnston in JI. S. A. I. of E.

Ills. 6000 w. E & M J—July 1, 1916. Use of balata, cotton, and rubber belts.

The Economics of Belt Conveyors (72055 A). Reginald Trauttschold. Third of a series on The Economics of Material Handling in Manufacturing Plants. Ills. 3500 w. E M—Aug., 1916. Types of conveyors, their adaptability, and costs.

Economics of Conveyor Equipments (74162 A). Reginald Trauttschold. Ills. 5800 w. E M—Nov., 1916. Analysis of costs, capacity, and power requirements for various types.

See also Assembly Methods, under *Machine Works and Foundries*.

Cranes

20-Ton Metre-Gauge Railway Break-down Crane (67386 A). Ills. 600 w. Eng—Dec. 31, 1915. Detailed description.

Proper Care of Cranes and Hoists (69776). H. A. Shultz. 3000 w. I T R—April 20, 1916. Design and operation.

Application of Cranes in the Foundry (70590). T. Everett Austin. Ills. 1200 w. I A—May 25, 1916. Notable installations.

Wall Cranes (70545 A). Ernest G. Beck. Ills. 1800 w. Mch W—May 12, 1916. Serial, 1st part. Design, construction, support.

Horizontal Luffing Crane with Balanced Jib (70519 A). Ills. 800 w. Eln—May 5, 1916. Shows saving in power.

Shipyard Cranes of the Rotterdam Dockyard Company (70742 A). M. G. De Gelder. Ills. 2500 w. Eln—May 12, 1916. Abstract of paper before Inst. of Naval Archts. Crane systems and their performance.

Selection of Electrical Apparatus for Cranes (70706 A). R. H. McLain and J. A. Jackson. Ills. 5500 w. G E R—June, 1916. Classes of cranes, and general selection of electrical equipment.

40-Ton Titan Block-Setting Crane (72539 A). Ills. 800 w. Eng—July 28, 1916. Used in Fishguard Harbor work.

Self-Propelling Grab Bucket Crane Excavator and Unloader (72477). Ills. 700 w. E & C—Aug. 16, 1916. Description.

Two Notable Floating Cranes (72520 A). H. H. Broughton. Ills. 3000 w. Eln—July 28, 1916. Two 150-ton electrically driven cranes, one of the non-revolving bridge type and the other of the revolving type.

See also Material Handling, under *Transporting and Conveying*.

Derricks

See same heading under CIVIL ENGINEERING, *Construction*.

Consult Classification of the Index. See page 7.

Electric Lifts

TRANSPORTING AND CONVEYING

Ore Handling

Electric Lifts

Control Gear for Electric Lifts (67824 A). Arthur L. Hawes. 2000 w. E I R—Dec. 31, 1915. Modern types and methods of control.

Elevators

Electric Elevators (65500). C. B. Garrison. Ills. 2500 w. Natl Engr—Nov., 1915. Maintenance, inspection, tests.

Modern Electric Elevators and Elevator Problems (66562 N). David Lindquist. Ills. 40 pp. A S M E—Dec., 1915. Practice and development.

Semi-Automatic Lifts on the "Underground" (67327 A). Ills. 800 w. Eln—Dec. 31, 1915. Stations in London.

Electric Lifts (69328 A). Abstract of paper by H. Marryat. 4000 w. Enr—March 17, 1916. Principles.

Gearless Traction Elevators (70689). Ills. 1200 w. Pwr—May 30, 1916. Outline of system, describing motors, control features and safety devices.

Belt-and-Bucket Elevators (71545). Arthur O. Gates. Ills. 5500 w. E & M J—July 1, 1916. Details of design.

Escalators

Escalators in Tube Railway Service (68839 A). Ills. 5000 w. E Rv—Feb. 15, 1916. As used in London.

Freight Handling

Portable Machinery for Package Freight Handling (70708 A). R. H. Rogers. Ills. 2000 w. G E R—June, 1916. Types of machines used, with data.

Gas Works

Transport- und Hebeeinrichtungen in Gaswerken (67776 B). Hubert Hermanns. Ills. 1800 w. Feuer—Jan., 1916. Serial, 1st part. Apparatus for transporting and lifting in gas works.

Grab Buckets

Neuzeitliche Selbstgreifer-Konstruktionen (66253 B). Wintermeyer. Ills. 3500 w. Z V d I—Nov. 27, 1915. Recent improvements in grab-bucket design.

Grain Handling

Grain Elevating and Conveying Plant at Sunderland (69707 A). Ills. 1600 w. Enr—March 31, 1916. New plant.

Handling Equipment

Handling Coal and Ashes at Grundy Plant (73678). Henry J. Edsall. Ills. 1800 w. Pwr—Oct. 3, 1916. Small modern plant and equipment.

Hoists

Die Hebezeuge an der Schweizerischen Landesausstellung in Bern, 1914 (67034 B). Hans Krapf. Ills. 1600 w. S B—Jan. 1, 1916. Serial, 1st part. Review of lifting apparatus exhibited at Berne Exposition.

Industrial Railways

Turnouts for Narrow-Gage Industrial Railway Track (67820). Ralph D. Brown. Ills. 1200 w. E N—Feb. 3, 1916. Complete formulas and tables.

Lifting Appliances

Manufacture, Strength, and Use of Chains, Slings, and Other Lifting Appliances (68097 A). Abstracted from memorandum by G. S. Taylor. Ills. 3500 w. Mch E—Jan. 21, 1916. Serial, 1st part. Methods of manufacture in the present number.

Material Handling

Labor Saving by the Use of Cranes (65992 A). Robert L. Streeter. Ills. 5000 w. Engng Mag—Dec., 1915. Second article of series, describing the mechanism and operation of cranes.

Handling Materials in Manufacturing Plants (66289 A). Robert L. Streeter. Ills. 6000 w. E M—Jan., 1916. Third article of series; uses to which conveyors may be applied.

Handling Materials in Manufacturing Plants (67093 A). Ills. 7000 w. E M—Feb., 1916. Fourth article of a series. Operation and efficiencies of various types of hoists.

Handling Materials in Manufacturing Plants (68333 A). R. L. Streeter. Ills. 5500 w. E M—March, 1916. Use of intermittent and continuous elevators.

Handling Materials in Manufacturing Plants (69184 A). Robert L. Streeter. Ills. 6000 w. E M—April, 1916. Sixth article of a series. Trucks and industrial cars.

Handling Materials in Manufacturing Plant (69958 A). Robert L. Streeter. Ills. 8500 w. E M—May, 1916. Concluding chapter of a series. Monorails, pneumatic systems, gravity conveyors.

The Economics of Material Handling in Manufacturing Plants (70606 A). Reginald Trauttschold. Ills. 3500 w. E M—June, 1916. First of a series of articles giving data on the economic size of locomotive crane.

The Economics of Material Handling in Manufacturing Plants (71345 A). Reginald Trauttschold. Ills. 3500 w. E M—July, 1916. Operation and cost analysis of overhead cranes, particularly in coal handling. Second paper.

See Conveyors, under *Transporting and Conveying*.

Ore Handling

Discussion on "Application of Electricity to the Ore Handling Industry" (Gilpin), Cleveland, Ohio, March 18, 1915 (66671 D). 2500 w. A I E E—Dec., 1915.

Overhead Travellers

Overhead Travellers

Notes on Electric Overhead Travellers (72617 A). E. Crane. 1500 w. Mch W—Aug. 11, 1916. Serial, 1st part. Advantages, importance of design and construction.

Pipe Lines

Oil Pipe-Line Systems in California (69423). C. P. Bowie. Map. 2500 w. W E—April, 1916. Construction and operation.

Pneumatic Transportation

Le transport pneumatique des matières en grains et principalement des blés (67049 B). Ch. Dantin. Ills. 2400 w. G C—Jan. 8, 1916. Pneumatic elevators in English granaries.

Ropeways

Aerial Ropeway at Niagara Falls (72016 A). Ills. 1500 w. Enr—July 7, 1916. Details of a passenger carrying ropeway.

Aërial Tramway as Substitute for a Bridge (71615). Ills. 1700 w. E N—July 6, 1916. Two-span cableway used in the Philippines.

MISCELLANY

Glass

Aerial Tramway Locked by Windstorm (71668). Hamilton W. Baker. Ills. 1000 w. E & M J—July 8, 1916.

Shipbuilding Cranes

Helling-Keßelkrane (68883 B). Hans Hermann Dietrich. Ills. 2500 w. Sch—March 8, 1916. Cable cranes for use around shipyards.

Telfer System

Elektrohängebahnanlagen für die Bedienung elektrischer Kraftwerke System Bleichert (67724 B). H. H. Dietrich. Ills. 2500 w. E K u B—Jan. 4, 1916. Serial, 1st. part. Applications of Bleichert overhead-rail tramways about electric generating stations.

Traverser

30-Ton Transverser at Moor-Street Goods Stations, Birmingham (69127 A). Ills. and Plate. 2000 w. Eng—March 10, 1916. Arrangements for handling perishable goods.

Trolley Hoists

Trolley Hoist Transporters (68891 A). H. Hubert. Ills. 2000 w. E Rv—March 15, 1916. Description of various machines.

MISCELLANY

Acetylene

The Explosibility of Acetylene (65883 N). George A. Burrell and G. G. Oberfell. 2000 w. U S Bureau of Mines—Tech paper 112. Experiments on limits of complete propagation of flame.

Agricultural Show

The Royal Agricultural Show at Manchester (71732 A). Ills. 700 w. Enr—June 29, 1916. Serial, 1st part.

Artificial Limbs

Ein Handsatz für Kriegsbeschädigte (69630 B). Ills. 2000 w. St u E—March 30, 1916. Mechanical hand invented for workmen.

Artificial Limbs for Maimed Soldiers (73448 A). Ills. 2500 w. Enr—Sept. 8, 1916. Abstract from article by Ch. Dantin, in *Le Génie Civil*, on work of M. Amar.

Bayonets

Testing Lee-Enfield Bayonets (71586 A). John J. Ralph. Ills. 1800 w. Mch—July, 1916. General requirements.

Chemical Apparatus

The Manufacture of Chemical Apparatus in the United States (70131 N). Arthur H. Thomas. 4000 w. J I I & E C—May, 1916. Status of Industry.

Clay Wares

The Casting of Clay Wares (70099). Taine G. McDougal. Ills. 20 pp. U S B M—Tech. paper 126. Procedure; precautions advisable.

Cotton-Opening Machinery

Cotton-Opening Machinery (67239 A). Ills. 1200 w. Eng—Dec. 24, 1915. Machines used.

Dyestuffs Factories

Design of Factories for the Manufacture of Dyestuffs (73304 A). Percival Robert Moses. 4500 w. M & C E—Sept. 4, 1916. Fundamental requirements of efficient manufacture.

Explosions

Gas Explosions in Flues (73007 A). From *Vulcan*. 3000 w. Mch E—Aug. 25, 1916. Explanation of causes and methods of prevention.

How the Windows Were Broken (73930). Frank Richards. Ills. 1000 w. C A M—Oct., 1916. Explains results of explosion of munitions in N. Y. harbor on July 30.

Explosives

The Manufacture of Explosives (73996). Stanley P. Moore. 2000 w. U S E, J I—Sept., 1916. Making and use of the more important explosives.

Fire Waste

The Significance of the Fire Waste (72891 N). Franklin H. Wentworth. 18 pp. A F A—Sept., 1916. Fire hazard, with special reference to foundries.

Glass

The Development of Low Expansion Glasses (70127 N). E. C. Sullivan. 2000 w. J I I & E C—May, 1916. Mate-

Glass Industry

rial resistant to sudden temperature changes.

Glass Industry

The Relation of Chemistry and Mechanical Manipulation to the Evolution of the Glass Industry (65522). Robert L. Frink. N. Y. address before Nat. Exp. of Chem. Ind. 3500 w. Met & Chem Engng—Nov. 1, 1915.

India

The Development of Mechanical Engineering in India (72163 A). Alfred Chatterton. Also editorial. 5500 w. Enr—July 14, 1916. Read before the Mysore Engrs' Assn.

Magnetic Hand

Die magnetische Hand (67046 B). G. Klingenberg. Ills. 1000 w. Z V d I—Dec. 18, 1915. Magnetic hand for use of cripples.

Munitions

The Industrial in Modern War (71076 B). R. D. Gatewood. 14 pp. U S N I, Pro—May-June, 1916. Outlines what should be done to organize the resources.

Molding Hand Grenades (71214). Allan Hill. Ills. 1000 w. B W—June, 1916. Molding of cast iron grenades.

MISCELLANY**Panama-Pacific**

Engineering at the Panama-Pacific Exposition (66191 A). 4500 w. A S M E JI—Dec., 1915. Discussion of papers by Bayley and Dickie.

Review of 1915

The Year's Review (66925). 3800 w. Pwr—Jan. 4, 1916. Progress and notable features of year.

Science

Science in Its Relation to Engineering (67252 A). Dr. John A. Brashear. Presidential address. 5000 w. A S M E JI—Jan., 1910. Value of scientific research. No sharp line between pure and applied science.

Tanning Industry

The Effect of Technical Education Upon the Leather Industry (66878). Allen Rogers. Ills. 2000 w. S A—Jan. 1, 1916. Benefits derived.

Textile Machinery

Machinery for Bleaching, Dyeing, and Printing Cotton Fabrics (69701 A). 3000 w. Enr—March 24, 1916. Serial, 1st part. Processes, details of machines.

Tree Felling

Tree Felling by Power (72580 A). Ills. 700 w. Enr—Aug. 4, 1916. The Ransome tree-felling saw.

Tree Felling

MINING AND METALLURGY

BASE METALLURGY	267	MINOR MINERALS	304
COAL AND COKE	271	OIL AND GAS	310
GEOLOGY	281	ORE DRESSING	314
IRON AND STEEL.....	283	PLACER MINING	321
MINE OPERATION	290	PRECIOUS METALLURGY	321
MINES AND DISTRICTS	298	MISCELLANY	324

Accounting

Accounting

Cost-Accounting in the Construction and Operation of a Copper Smelter (69977). Ernest Edgar Thum. 5000 w. M & C E—May 1, 1916. Serial, 1st part. Essentials of system.

Assay

Notes on the Chemical Assay of Tin Ores (71902 N). A. M. Matheson. 2000 w. M & E R—June 5, 1916. Shows difference between fire and chemical assays.

Ashio

Ashio's Copper-Smelting Works at Honzan, Japan (66606). Ills. 1200 w. E & M J—Dec. 18, 1915. Methods used. A new dust-settling system.

Bag-Houses

The New Bag-House at the Midvale Smelter (70548). L. S. Austin. Ills. 1200 w. M & S P—May 20, 1916. Detailed descriptions of improvements introduced in Utah.

Braden

Metallurgical Operations at the Braden Copper Co. (68052). R. E. Douglass and B. T. Colley. Read at 2nd Pan-Am. Sci. Cong. Ills. 6000 w. E & M J—Feb. 12, 1916. Details of concentration and smelting.

Blast Furnaces

Tuyere Connections for Copper and Lead Blast Furnaces (73827). Richard H. Vail. Ills. 2500 w. E & M J—Oct. 7, 1916. Types used at the North American smelting works, with comments.

Channing, J. Parke

J. Parke Channing, and Copper Mining (73685). An interview. By T. A. Rickard. Ills. 6500 w. M & S P—Sept. 30, 1916. An interesting record of experiences in mining development.

Chloridizing and Leaching Plant of Virginia Smelting Co. (70202). F. A. Eustis.

BASE METALLURGY

Copper

Ills. 900 w. E & M J—May 6, 1916. At West Norfolk, Va., for pyrite cinder.

Chuquicamata

Metallurgical Operations at the Chile Exploration Co. (68058). C. A. Rose. Ills. 2500 w. E & M J—Feb. 12, 1916. New leaching plant.

Concentrates

Selling Lead and Zinc Concentrates (70836 N). W. Shellshear. 2500 w. M & E R—May 5, 1916. Valuation of lead-zinc ores and some metallurgical problems connected.

Consolidated Arizona

Reverberatory Smelting at Consolidated Arizona Smelting Company, Humboldt, Arizona (66944). 1200 w. M & C E—Jan. 1, 1916. Plant, equipment, and methods.

Copper

Notes on the Metallurgy of Copper (70314 N). D. H. Browne. 2200 w. C M I, Bul—May, 1916. Review.

Mining at the Nevada Consolidated (70990). P. B. McDonald. Ills. 3500 w. M & S P—June 10, 1916. History of development.

Mount Cannindah Copper Mine (72750 N). Lionel C. Ball. Plan. 6500 w. Q G M JI—July, 1916. History, geology, ore, mining, smelting, etc., of the Queensland property.

Rio Tinto Copper Syndicate's Mine, Montalbion, Irvinebank District (72749 N). E. Cecil Saint-Smith. Ills. 2000 w. Q G M JI—July, 1916. Geological survey report, describing mining methods, probable amount of ore, and future prospects. Commercial aspects.

The Annealing Properties of Copper at Temperatures Below 500° C, with Particular Reference to the Effect of Oxygen and of Silver (73176 N). G. V. Caesar

Consult Classification of the Index. See page 7.

Copper Determination

and G. C. Gerner. 40 pp. A I Mt—Sept., 1916. Investigations and conclusions.

The Mine and Mill Plant of the Inspiration Consolidated Copper Co. (73259 D). H. Kenyon Burch. Ills. 33 pp. A I M E, Bul—Sept., 1916. Details of plant, and latest practice in treatment of low-grade chalcocite ores.

Two Great Copper Mines Compared (73089). P. B. McDonald. 1500 w. M & S P—Sept. 9, 1916. The Nevada Consolidated and the Calumet & Hecla mines.

Copper Determination

Determination of Copper in Low-Grade Ores (72459). F. O. Hawley. 2000 w. E & M J—Aug. 12, 1916. Details of method adapted to slags.

Copper Leaching

Roasting and Leaching Concentrator Slimes Tailings (66419 D). 1700 w. A I M E Bul—Dec., 1915. Discussion of Lawrence Addicks' paper.

Some Problems in Copper Leaching (66418 D). 500 w. A I M E Bul—Dec., 1915. Discussion of L. D. Ricketts' paper.

Copper Metallurgy

Recent Progress in the Metallurgy of Copper (67449 B). Heinrich O. Hofman. 5000 w. F I JI—Jan., 1916. Covering last ten years.

Metallurgy of Copper in 1915 (67160). Lawrence Addicks. 2200 w. E & M J—Jan. 8, 1916. Progress in leaching, roasting, melting, fume condensation, and refining.

Copper Metallurgy at Garfield, Utah (71720). L. O. Howard. 3000 w. M & S P—July 8, 1916. Describes the Arthur mill and the Garfield smelter.

Comparisons between Electrolytic and Two Varieties of Arsenical Lake Copper with Respect to Strength and Ductility in Cold-Worked and Annealed Test Strips (71757 D). C. H. Mathewson and E. M. Thalheimer. Ills. 40 pp. A I M E, Bul—July, 1916. Experimental study.

Drilling and Analysis of Copper Ores (71667). A. J. Sale. 3000 w. E & M J—July 8, 1916.

Operating a Small Copper Blast Furnace (71974). A. Bregman. Ills. 4000 w. E & M J—July 22, 1916. Details of operation and difficulties.

Sources of Metal Loss in Copper Refining (71574). Lawrence Addicks. 5000 w. M & C E—July 1, 1916. Analysis of the different losses.

Copper Refining

The Development of Electrolytic Copper Refining (67132). Lawrence Addicks. Read at Int. Engng. Cong. 2500 w. C M JI—Jan. 1, 1916. Processes used.

BASE METALLURGY**Electrolytic Zinc****Copper Reverberatories**

Gas-Fired Reverberatory Furnace at Sulitjelma, Norway (66767). C. Offerhaus. Ills. 3500 w. E & M J—Lec. 25, 1915. Account of practice in smelting Elmore concentrates.

Copper Smelteries

Copper Queen Reduction Works, Arizona (65593). C. A. Tupper. Ills. 2000 w. Min & Engng Wld—Nov. 6, 1915. Improvements.

Smelting at Panulcillo, Chile (65716). Ills. 1800 w. Eng & Min Jour—Nov. 13, 1915. Describes smelting operations of Chile Copper Co.

Cottrell Process

See Precipitation under ELECTRICAL ENGINEERING, *Electro-Physics*.

Crystallization

Tungsten-Molybdenum Equilibrium Diagram and System of Crystallization (71758 D). Zay Jeffries. Ills. 10 pp. A I M E, Bul—July, 1916. Determination of melting points of metals and alloys having high-fusion temperatures.

Crystallography

X-Rays and Crystal Structure, with Special Reference to Certain Metals (70860 A). W. H. Bragg. Ills. 900 w. Enr—May 19, 1916. Abstract of paper before Inst. of Metals. Application to the study.

Dust Losses

Method of Determining Dust Loss at Copper Cliff, Ont. (68976). Edward H. Robie. Ills. 2500 w. E & M J—March 18, 1916. Methods.

Electric Furnaces

Electric Furnaces as Applied to Non-Ferrous Metallurgy (69853 N). Alfred Stansfield. 26 pp. Inst Met—March 29, 1916. General discussion.

See also same heading under ELECTRICAL ENGINEERING, *Power Applications*.

Electrolytic Copper

The Production and Properties of Electrolytic Copper (66067 A). B. Welbourn. Abstract of address to Manchester Sec. of I. E. E. 3000 w. Eln—Nov. 19, 1915. Description of processes.

Electrolytic Copper (66078 A). 2500 w. Eng—Nov. 19, 1915. Editorial review of B. Welbourn's paper.

Electrolytic Zinc

Electrolytic Zinc at Bully Hill (67830). C. A. Hansen. Ills. 1000 w. M & C E—Feb. 1, 1916. Criticism of statements by Messrs. Lyon, Ralston and Cullen.

Electrolytic Zinc (68565). W. R. Ingalls. 3500 w. E & M J—March 4, 1916. Status and future of this recent development. Necessary conditions for success. Questions of power, ore and product.

Consult Classification of the Index. See page 7.

Electrostatic Separation

Electrolytic Zinc (69027). Harry A. B. Motherwell. 2000 w. M & S P—March 18, 1916. Bradley-Williams process.

Electrostatic Separation

See ELECTRO-PHYSICS.

Enrichment

Some Reactions Involved in Secondary Copper Sulphide Enrichment (72862 B). E. G. Zies, E. T. Allen, and H. E. Merwin. 95 pp. E G—July-Aug., 1916. Considers reactions involved when the sulphides commonly present in copper ores are exposed to the action of the enriching solutions.

Furnace Linings

Chrome-Iron Ore as Lining for Reverberatory Furnaces (67861). Edgar Hall. 1800 w. E & M J—Feb. 5, 1916. Trial at Silverspur, Queensland.

Hall Process

The Hall Process for Recovering Sulphur (68406 N). Howard F. Weirum. 2200 w. C M I, Trans—1915. Brief summary.

Hydrometallurgy

Hydrometallurgy of Zinc and Lead in 1915 (66943). D. A. Lyon, O. C. Ralston, and J. F. Cullen. 3000 w. M & C E—Jan. 1, 1916. Plants and processes and advances during year.

International Smeltery

International Smeltery at Miami (68564). R. W. Kerns. Ills. 2000 w. E & M J—March 4, 1916. New Arizona plant.

Leaching

See Flotation under *Ore Dressing*.

Lead

Lead in 1915 (73492 N). C. E. Sieben-thal. 18 pp. U S G S, I: 9—Sept. 23, 1916. General report.

Lead Metallurgy

Metallurgy of Lead in 1915 (67159). H. O. Hofman. 2000 w. E & M J—Jan. 8, 1916. Handling, smelting, desilverization methods, etc.

Lead Refining

Plant of U. S. Metals Refining Company (72186). Ills. 2000 w. P E, C—Aug. 1, 1916. Application of direct current in the lead refining industry.

Lead Roasting

The Double Roasting Process at East Helena (70232). 4000 w. M & S P—May 6, 1916.

Lead Smelting

The Advantages of High-Lime Slags in the Smelting of Lead Ores (66421 D). 600 w. A I M E Bul—Dec., 1915. Discussion of S. E. Bretherton's paper.

The Selby Lead Smelter (69403). T. A. Rickard. Ills. 4500 w. M & S P—April 8, 1916. Running description.

BASE METALLURGY**Pulverized Fuel**

Mechanical Feeding as Applied to Silver Lead Blast Furnaces (70480). L. Douglass Anderson. Ills. 2500 w. E & M J—May 20, 1916. New system at Midvale, Utah.

Lead Sulphate

The Decomposition and Reduction of Lead Sulphate at Elevated Temperatures (70299 D). W. Moslowitsch. 2200 w. A I M E, Bul—May, 1916.

Lead-Zinc

Half Year in the Joplin Lead-Zinc District (72322). Burt W. Lyon. 1200 w. M & E W—Aug. 5, 1916. Production, prices, etc., reviewed.

The Southwest Virginia Lead-Zinc Deposits (74046). Sydney H. Ball and Lester S. Thompson. Ills. 2000 w. E & M J—Oct. 21, 1916. Investigation leading to the conclusion that the deposits are of magmatic origin.

Metallurgy

The Properties of Solid Solutions of Metals and of Inter-Metallic Compounds (71470 N). F. C. Thompson. 2500 w. Faraday Soc—May, 1916. Investigates hardness and electrical resistivity.

Grain-Size Measurements in Metals, and Importance of Such Information (71474 N). Zay Jeffries. 5000 w. Faraday Soc—May, 1916. Cases where such measurements might be employed profitably. Outlines methods.

Mines Report

Silver, Copper, Lead, and Zinc in the Central States in 1915 (72248 N). J. P. Dunlop and B. S. Butler. 90 pp. U S G S, I: 5—July 28, 1916. Report of production.

Nickel

Le Nickel Et La Guerre (73506 B). H. Volta. Ills. 1400 w. La Nt—Aug. 5, 1916. General review of present methods of mining and smelting nickel.

Non-Ferrous Metals

Report of Committee B-2 on Non-Ferrous Metals and Alloys (71432 N). 31 pp. A S T M—June, 1916. Recommended revisions and proposed specifications.

Oxygen-Iron Torch

The Oxygen Iron Torch (68404 N). David H. Browne. 1200 w. C M I, Trans—1915. Clever device for tapping settler.

Pulverized Fuel

Pulverized Coal for Copper Smelting (65592). N. L. Warford. Ills. 700 w. Min & Engng Wld—Nov. 6, 1915. Plant of Anaconda Copper Mining Co.

Coal-Dust Firing in Reverberatory Furnaces (68050). C. R. Kuzell. Read before 2nd Pan. Am. Sci. Cong. Ills. 3000 w. E & M J—Feb. 12, 1916. Résumé of history.

Consult Classification of the Index. See page 7.

Pyritic Smelting**Pyritic Smelting**

Smelting Copper Pyrites with Copper Ore 46% and 7.5 Sulphur (69393). 2500 w. M & E W—April 8, 1916. From presidential address of Robert C. Sticht before the Aust. Inst. of Min. Engrs.

Quicksilver

Quicksilver Reduction (70393). Herbert Lang. 9000 w. M & S P—May 13, 1916. Summary of metallurgy.

Refining

Electrolytic Refining of Copper (74119 N). F. L. Antisell and S. Skowrowski. Ills. 9 pp. A I Mt—Sept., 1916. Explains theory and practice.

Review of 1915

Metallurgy in 1915 (66938). 3000 w. M & C E—Jan. 1, 1916. Review of the year's progress in the metallurgy of the precious metals, copper and zinc.

Siberia

L'Industrie De La Sibirie Et La Guerre (74237 B). A. Kaminer. Ills. 2100 w. La Nt—Sept. 16, 1916. Outline of present conditions in Siberian industries.

Slag Uses

Uses of Furnace Slag (69148). Herbert Lang. 3000 w. M & S P—March 25, 1916. Industrial uses. Methods employed.

Smelter Smoke

Report of the Selby Smelter Commission (65547 N). Ills. J. A. Holmes, Edward C. Franklin, and Ralph A. Gould. 520 pp. U S Bureau of Mines—Bul. 98. Smelter smoke problems are investigated.

Smelting

Smelting and Selling Australia's Base Metals (71278). 2000 w. E & M J—June 24, 1916. Details of plan to substitute British for German control of lead and zinc outputs.

Spelter

The Engle Furnace for Redistilling Spelter (72094). Robert H. Engle. Ills. 2500 w. E & M J—July 29, 1916. Improved form of zinc-distilling furnace.

Tin

The Patiño Tin Mines, Bolivia (73073). Benjamin L. Miller and Joseph T. Singewald, Jr. Ills. 3000 w. E & M J—Sept. 9, 1916. History of these tin properties and their development.

Tin Ore in Northern Lander County, Nevada (73165 N). Adolph Knopf. Map. 13 pp. U S G S—Bul 640-G.

Tin Extraction

Chemical Methods of Tin Extraction (72140 B). O. J. Stannard. 3500 w. M Mg—July, 1916. Chances of using chemical-metallurgical processes.

Washoe Works

The Washoe Reduction Works, Anaconda, Montana (67973). L. S. Austin.

BASE METALLURGY**Zinc Metallurgy**

Ills. 4000 w. M & S P—Feb. 5, 1916. Serial, 1st part. Complete description.

Zinc

Exploitation of Arkansas Zinc (72457). Lucius L. Wittich. Ills. 2000 w. E & M J—Aug. 12, 1916. Conditions; milling methods; new developments and commercial aspects.

Notes on Zinc (72616 A). Halstead Best. 2000 w. Mch W—Aug. 11, 1916. Commercial zinc, its physical properties, foundry uses, etc.

Recent Developments in Zinc Concentration Practice in the Joplin District, Missouri (73309 A). H. C. Parmelee. 3000 w. M & C E—Sept. 15, 1916. Milling practice, and recent improvements.

Comments and Speculations on the Metallurgy of Zinc (73822). W. R. Ingalls. Ills. 4000 w. E & M J—Oct 7, 1916. Details of zinc metallurgy and possible improvements.

The Donora Zinc Works (73828). W. R. Ingalls. Ills. 3000 w. E & M J—Oct. 7, 1916. Details of plant recently built in the Pittsburgh district.

The Metallurgy of Zinc (73712 A). Ernest A. Smith. From a paper on "The Development of the Spelter Industry," read before the Inst. of Metals, London. 5000 w. Mch E—Sept. 22, 1916. Serial, 1st part. History, methods of production, industrial applications, and present status of the industry.

Zinc Deposits of Montauban Township, Quebec (74043). J. A. Bancroft. 1500 w. C M JI—Oct. 15, 1916. Deposits, mode of occurrence and development.

Zinc Blast Furnace

Tests of the Lungwitz Zinc-Smelting Process (66239 N). W. McA. Johnson. 2800 w. M M S A Bul—Nov. 30, 1915. Unsuccessful tests of smelting under pressure. With discussion.

Zinc Calcination

The Calcination of Zinc Carbonate (68103). William P. Simpson. 2200 w. M & C E—Feb. 15, 1916. History and methods.

Zinc-Lead

Some Zinc-Lead Mills of California and Nevada (72485). Leroy A. Palmer. Ills. 1800 w. M & C E—Aug. 15, 1916. Details of three mills.

Zinc and Lead Districts of Wisconsin (72323). J. H. Lewis. Ills. 1500 w. M & E W—Aug. 5, 1916. Reviews production during first half of 1916.

Zinc Metallurgy

Metallurgy of Zinc in 1915 (67161). W. R. Ingalls. 2500 w. E & M J—Jan. 8, 1916. Smelting, refining, electrolytic production.

Consult Classification of the Index. See page 7.

Zinc Oxide**Zinc Oxide**

Zinc Oxide from Lead Blast Furnace Slag, as in Operation at South Chicago (65520). H. B. Pulsifer. Ills. 1200 w. Met & Chem Engng—Nov. 1, 1915. Recovery from slag dumps by B. F. Hedges and R. D. Divine.

Zinc Recovery

Discussion of the Methods of Recovering Zinc (71306). L. D. Anderson. 3000 w. U S E—May, 1916. Describes meth-

COAL AND COKE**Byproducts**

ods for extracting zinc as commercial product from copper and lead ores.

Zinc Smelters

The Zinc Smelter of Today (70883 B). F. E. Pierce, with discussion. 40 pp. E S W P—Feb., 1916. Elements of the processes, apparatus employed, etc.

Zinc Works

The American Steel & Wire Company's Zinc Works (67115 B). Ills. 2000 w. I A—Jan. 6, 1916. Plant at Donora, Pa.

COAL AND COKE**Accidents**

See Coal Mining under **INDUSTRIAL MANAGEMENT, Welfare and Safety.**

Alberta

The Drumheller Coal Field, Alberta (67334 A). D. A. Macaulay. Ills. 1800 w. C G—Dec. 31, 1915. Mines in operation.

Anthracite Sizes

Economic Aspects of the New Anthracite Sizes (70367). 2500 w. Cl A—May 13, 1916. Motive for proposed changes.

Belgium

The Campine Coal Field (68913 A). P. Krush, in *Gluckauf*. Maps. 4000 w. C G—Feb. 25, 1916. Serial, 1st part. Also editorial. Relation to other fields.

Blackdamp

The Rapid Estimation of Oxygen and Blackdamp in the Air of Safety-Lamp Mines (68633 A). I & C T R—Feb. 18, 1916. From paper by Henry Briggs before Min. Inst. of Scotland, describing appliance.

Black Damp in Mines (73321). G. A. Burrell, I. W. Robertson, and G. G. Oberfell. 75 pp. U S B M—Bul 105. Results of study, showing how air entering a coal mine loses oxygen and gains carbon dioxide.

Boreholes

The Exploratory Borehole (73907). James Steelman. Ills. 3000 w. Cl A—Oct. 14, 1916. Types of machines and results.

Briquetting

Fuel Briquetting in 1915 (70406 N). C. E. Leshar. 1200 w. U S G S, II:1—May 6, 1916. Progress of the industry.

Byproduct Coke

Coke-Ovens with Tap Heat (65700 A). O. Simmersbach. From an article in *Stahl und Eisen*. Ills. 1500 w. Ir & Coal Trds Rev—Oct. 29, 1915. Details of the Collin coke oven.

Coke Ovens Heated From Above (66338 A). Ills. 700 w. I A—Dec. 9, 1915. German tests.

Byproduct Coke Ovens

Byproduct Coking Installation in Great Britain (67606). Frederick C. Coleman. Ills. 1200 w. Cl A—Jan. 29, 1916. Kopper's oven plant in north of England. Byproducts consist of gas, tar, sulphate of ammonia, and benzol.

By-Product Coke Ovens (69885 A). Ills. 5000 w. I & C T R—April 7, 1916. From pamphlet by Kotaro Shimomura. Principal designs.

Byproducts

Coal Gas Residuals (65649). Fred H. Wagner. Ills. 5500 w. Sci Am Sup—Nov. 13, 1915. Valuable by-products and methods of saving them.

Destillationsuntersuchungen deutscher Steinkohlen (65980 B). Oskar Simmersbach and Max Ziem. Ills. 2400 w. Research work on distillation products obtainable from various German hard coals.

Presidential Address to the Institution of Mining Engineers (66491 N). T. Y. Greener. 5500 w. I M E—Nov., 1915. Principally quality of coke and output of byproducts.

Coal Tar and Its Products (66910). 1200 w. E & M J—Jan. 1, 1916. Diagram.

Benzol (67244 A). George Taylor. Abstract of paper read before Coke Oven Mgrs. Assn. 1500 w. I & C T R—Dec. 24, 1915. Details of plant, distillation and purification.

Thermal Reactions in the Vapor Phase of Various Coal Tar Oils and Distillates (66940). Walter F. Rittman and Gustav Egloff. 2500 w. M & C E—Jan. 1, 1916. Experiments in low-grade coal-tar oils for production of valuable hydrocarbons.

The Comparative Value of Domestic Ammonium Sulphates and Imported Nitrates (67578). David T. Day. 900 w. M Rd—Jan. 27, 1915. Uses as fertilizers and as powerful explosives.

The Development in the United States of Manufacture of Products Derived from

Consult Classification of the Index. See page 7.

Byproducts

Coal (67762 N). H. W. Jordan. 2500 w. JI I E C—Feb., 1916. Suggestions. Paper before Amer. Inst. Chem. Engrs.

The Utilization of Energy from Coal (67931 A). William A. Bone. From lecture at the Roy Inst. 2000 w. C G—Jan. 21, 1916. Serial, 1st part. Values of coal other than as fuel.

Notes on the Uses and Markets of By-products Obtained from Coke Ovens (68088 A). Read before Midland Inst. of Min., Civ., & Mech. Engrs. 4000 w. C G—Jan. 28, 1916. Their importance.

Notes on the Uses and Markets of By-Products Obtained from Coke-Ovens (69048 N). 7000 w. Also discussion. I M E, Trans—Feb., 1916. Part played in economy of nation.

The Volatile Matter of Coal (68954 N). J. G. O'Neill. 3500 w. A S N E, JI—Feb., 1916. Products; methods of treatment.

Les progrès successifs dans la carbonisation de la houille au point de vue de la récolte des sous-produits (69608 C + D). Paul Mallet. Ills. 24 pp. S E I N—Jan.-Feb., 1916. Progress in coal carbonization and production of byproducts.

Properties of Cyanogen and Its Recovery from Coal Gas (69555). Ills. 2500 w. G A—April 15, 1916. Fred. H. Wagner describes Bartlett Hayward process and its application.

Wilton's Sulphate of Ammonia Plant (69592 A). Ills. 1500 w. C G—March 31, 1916. Detailed description.

Coking, the Recovery and Working-up of By-products (70087 A). Ills. 1800 w. I & C T R—April 21, 1916. Serial, 1st part. Abstract of paper by Christopher Barber, before Sheffield Univ. Students' Assn. Benzol and toluol recovery.

Gas-Producers at Collieries for Obtaining Power and By-Products from Unsaleable Fuel (70282 N). Mansfeldt Henry Mills. 2 plates. Also discussion. 33 pp. I M E, Trans—April, 1916. Details of plants, and information related.

By-Products Recovered in Coke Manufacture (70718 A). William Hamlin Childs, with discussion. 3000 w. I A—June 1, 1916. Primary by-products.

Sulphate of Ammonia and Benzol (71157 A). D. Bagley. 4000 w. I & C T R—June 2, 1916. Critical examination of these by-products.

The Utilization of By-Products from the Manufacture of Coke (71984 B). C. G. Atwater, with correspondence and discussion. 36 pp. E S W P, Pro—May, 1916. Considers coal distillation.

The Production of Smokeless Fuel, Gas, Oil and Ammonia (72018 A). Ills. 3000 w. I & C T R—July 7, 1916. Experiments being conducted at the Port Dun-

COAL AND COKE

Coal

das Electricity Station of the Glasgow Corporation.

A New American Industry (73577 A). P. R. Moses. Ills. 2000 w. E M—Oct., 1916. Probable rewards. Buildings, etc.

Coal-Tar Pitch (73026 B). John Morris Weiss. 3500 w. JI I & E C—Sept., 1916. Manufacture, physical and chemical properties, uses, etc.

The By-Product Coking Industry in the South (73143 A). C. E. Leshner. 2200 w. M Rd—Sept. 14, 1916. The demand for development of dye manufacturing.

The Processes of the Organic Chemical Industry Used in the Manufacture of Intermediate Products (73303 A). A. H. Ney and D. J. Van Marle. Ills. 4500 w. M & C E—Sept. 15, 1916. Nitro-compounds, their application, etc.

Coal and Coke By-Products as a Source of Fixed Nitrogen (73949 A). Horace C. Porter. Read before Am. Chem. Soc. 4500 w. M & C E—Oct. 15, 1916. Remarkable growth of by-product coke making; methods of recovery of fixed nitrogen, etc.

The Saving of By-Products in Coke Manufacture (74117 N). J. C. H. Mingaye. 2500 w. M & E R—Sept., 1916. On the waste of gas and loss of by-products by the use of beehive ovens.

See also Coal-Gas Residuals under CIVIL ENGINEERING, *Materials of Construction*.

Canada

The Production of Coal and Coke in Canada During the Calendar Year 1914 (66848 N). 39 pp. C D M—No. 348. Advance chapter of annual report.

The Coal Situation in Canada (68157 N). W. J. Dick. 3500 w. C M I, Bul—Feb., 1916. Value and resources.

Chemistry

The Application and Earning Power of Chemistry in the Coal Mining Industry (69481 D). Edwin M. Chance. 1500 w. A I M E, Bul—April, 1916. Services of chemist.

Chemistry in Coal Mining (72554). A. G. Blakeley. 7000 w. CI A—Aug. 19, 1916. Fields of activity for the coal mine chemist.

Clean Coal

Getting Clean Coal (73609). Thomas G. Fear. 1500 w. CI A—Sept. 30, 1916. Factors having a bearing on production.

Clinkering

Clinkering of Bituminous Coal (73804). F. C. Hubley. Ills. 2000 w. Pwr—Oct. 10, 1916. Serial, 1st part. Apparatus for testing samples and analyzes many curves plotted.

Coal

The Constitution of Coal (73011 A). D. T. Jones and R. V. Wheeler. 2500 w.

Consult Classification of the Index. See page 7.

Coal Analysis

C G—Aug. 18, 1916. Research to determine the chemical character of the main components of coal.

Coal Analysis

Making a Chemist's Balance (65377). F. W. Salmon. Ills. 1500 w. Power—Nov. 2, 1915. For coal analysis.

Determination of Nitrogen in Coal (65851 N). Arno C. Fieldner and Carl A. Taylor. 18 pp. U S Bureau of Mines—Tech paper 64. A comparison of various modifications of the Kjeldahl method with the Dumas method.

Graphic Studies of Ultimate Analyses of Coals (68652 N). Oliver C. Ralston. With preface by Horace C. Porter. Ills. 33 pp. U S B M—Tech paper 93. Results of study.

Interpretation of Coal Analysis (70466). E. G. Bailey. Read before Int. Ry. Fuel Assn. 1700 w. R A G—May 19, 1916. Importance of sampling, questions relating to analysis

Coal and Iron

The South's Coal and Iron and Their Relation to World Affairs (73141 A). Edwin C. Eckel. 2500 w. M Rd—Sept. 14, 1916. Facts concerning the Southern supply of these raw materials.

Coal Breakage

Successful Reduction in Coal Breakage at Tipples (69251). Miner Raymond. Ills. 1000 w. Cl A—April 1, 1916. Methods of transporting.

Coal Breakers

Tests on Various Electric Motor-Driven Equipment Used in the Preparation of Anthracite Coal (67943 D). H. M. Warren, A. S. Biesecker, and E. J. Powell. 2500 w. Charts. A I M E, Bul—Feb., 1916. Tests on individual motor drives.

Coal Classification

Die Unterschiedung der Mineralkohlen vom technischen und bergrechtlichen Standpunkte (67732 B). Ed. Donath. 4000 w. M R—Jan. 1, 1916. Serial, 1st part. Classification of coal on a technical basis and with regard to mining regulations.

Coal Conveyors

Coal Face Conveyors (69709 A). James Jackson. Ills. 2500 w. I & C T R—March 24, 1916. Read before Nat. Assn. of Col. Mgrs. United Bridgewater center-gate conveyor.

Coal Cutters

The "Diamond" Coal Cutting and Conveying Machines (66326 A). T. Campbell Futers. Ills. 1000 w. C G—Nov. 26, 1915. Serial. 1st part. Types of machines.

The "Hardiax" Coal Cutter (67246 A). Ills. 1500 w. I & T R—Dec. 24, 1915.

COAL AND COKE**Coal Fields**

Permissible Coal Cutters (68211). Ills. 2000 w. Cl A—Feb. 19, 1916. Explosion-proof machines.

Discussion on Mr. Sam Mavor's Paper on "Compressed Air for Coal-Cutters" (68171 N). Ills. 5000 w. I M E, Trans—Jan., 1916.

Discussion of Mr. Sam Mavor's Paper on "Compressed Air for Coal-Cutters" (69742 N). 9 pp. I M E, Trans—March, 1916. Continued discussion.

Application of Correct Methods (69250). E. C. DeWolfe. Ills. 1200 w. Cl A—April 1, 1916. Advantage of top cutter.

Some Coal-Cutting Difficulties (69333 A). H. T. Mackinnon. Read before W. Scotland Br. of Assn. Min. Elec. Engrs. Also discussion. 7000 w. I & C T R—March 17, 1916. Points requiring attention.

Compressed Air for Coal-Cutters (70281 N). Sam Mavor, with discussion. 98 pp. I M E, Trans—April, 1916. Application.

Coal Dust

The Inflammability of Illinois Coal Dusts (70269). J. K. Clement and L. A. Scholl, Jr. Maps & Ills. 62 pp. U S B M—Bul. 102. Report of detailed study.

Coal Dust, How It Affects the Mines in the Crownsnest Pass (71770 N). William Shaw. 3000 w. C M I, Bul—July, 1916. General conditions; methods of preventing ignition.

South Wales Coal Dust Experiments (72685 A). W. W. Hood, G. Knox, and E. C. Evans. 3500 w. C G—Aug. 11, 1916. Reviews report on experiments, methods, etc.

Coal Dust—How It Affects the Mines in the Crownsnest Pass (73992 N). 2500 w. C M I Bul—Oct., 1916. James Ashworth's critical discussion of Mr. Shaw's paper and the author's reply.

Coal Fields

The Foreign Coal Fields (69938). A. T. Shurick. 4000 w. Cl A—April 29, 1916. Latest data.

Structure of South Staffordshire Coal Field (72291 A). E. A. Newell Arber. From paper before S. Staffordshire and Warwickshire Inst. of Min. Engrs. 4500 w. C G—July 21, 1916. Relationship and comparison with adjoining fields.

Mining and Dealing with Mine Water in the Buckley Coalfield (73708 A). William Hopwood. Ills. 5000 w. I & C T R—Sept. 15, 1916. History and description of the field and its working.

Water Supply in the South Yorkshire Coalfield (74086 A). J. H. Drew. Ills. 1800 w. S M C E—Oct. 6, 1916. From paper at N E Dist. of Inst. of Mine &

Consult Classification of the Index. See page 7.

Coal Lands

Coal Engrs. Extension to water works. Special features.

Coal Lands

Regulations Governing Coal-Land Leases in the Territory of Alaska (72660 N). Maps. 80 pp. U S Dept Int—May 18, 1916. With information regarding comparison with adjoining English coal fields.

Coal Oil

The Production of Oil from Coal (67243 A). Ills. 1200 w. Enr—Dec. 24, 1915. Details of experimental plant at Chiswick.

Coal Preparation

Standardization of Coal Preparation (67784 N). H. C. Adams. 11 pp. Int Ry Fuel Assn Pro—1915. Advantages and methods; with discussion.

Kohlensichtanlage und Schlammaufbereitung mit Schwefelkiesgewinnung der Zeche Mont-Cenis (67764 B). P. Cabolet. Ills. 2400 w. Glck—Jan. 1, 1916. Plant at Mont-Cenis mine for dressing coal, preparing fines and recovering pyrite.

The Preparation of Bituminous Coal (71525). Andrews Allen. Ills. 4500 w. Cl A—July 1, 1916. Methods of cleaning and sizing.

Dry Preparation of Bituminous Coal in Illinois Mines (73491 N). E. A. Holbrook. Ills. 120 pp. U I, Bul No. 88—June 26, 1916. Present practice; types of tipples; impurities and breakage.

Production of Coal in 1914 (66437 N). C. E. Leshner. 160 pp. U S G S, II:31—Nov. 29, 1915. Statistics.

Coal Resources

Coal Resources of the United Kingdom (72546 A). Arnold Lupton. Read before S. Wales Inst. of Engrs. 5000 w. I & C T R—July 28, 1916. Reserves, future production, substitutes for coal, economy and waste.

Coal Storage

Insuring the Coal Supply (65559). Henry J. Edsall. Ills. 5000 w. Coal Age—Nov. 6, 1915. Methods of stocking and precautions.

See RAILWAY ENGINEERING, *Permanent Way and Buildings*.

Coal-Tar Colors

The British Coal Tar Color Industry and Its Difficulties in War Time (72547 A). C. M. Whittaker. Abstract of paper before Soc. of Chem. Ind. 1000 w. I & C T R—July 28, 1916.

Research, Scientific and Industrial, in the Coal-Tar Dye Industry (73027 B). Bernhard C. Hesse. 5500 w. J I & E C—Sept., 1916. Address at Chemistry Conf., Chicago. Contributions of chemical research.

COAL AND COKE**Collieries****Coal Trade**

The Coal Trade in Nova Scotia, in Relation to Imperial Economics (73990 N). F. W. Gray. 2200 w. C M I Bul—Oct., 1916. Possibility of utilizing the natural resources of the Dominion to national advantage.

Coke

Gewinnung und Aussenhandel Deutschlands und Grossbritanniens an Koks und sogenannten Nebenerzeugnissen (65450 B). Ernst Jüngst. 4000 w. Glck—Oct. 16, 1915. Statistical comparison of coke industry in Germany and Great Britain.

The Effect of Aeration and "Watering Out" on the Sulphur Content of Coke (67438 D). J. R. Campbell. 1200 w. A I M E, Bul—Jan., 1916. Sulphur as pyrite and other forms.

Report of Committee D-6 on Coke (71438 N). Ills. 14 pp. A S T M—June, 1916. Methods of sampling.

Report of A. F. A. Committee on Standard Methods for Analyzing Coke (72905 N). Ills. 13 pp. A F A—Sept., 1916. Recommendations.

A New Portable Coke Loader (71527). L. R. W. Allison. Ills. 1200 w. Cl A—July 1, 1916. Efficient machine.

Coke Manufacture

Die Beschickung von Koksöfen mit kleinen, elektrisch betriebenen Fülltrichterwagen (68802 B). K. Döbelstein. Ills. 1500 w. E K u B—Feb. 14, 1916. Electrically driven hopper-bottom charging cars of small size for coke ovens.

Coke Ovens

New Coke Ovens at Port Clarence Works (71007 A). Ills. 1600 w. I & C T R—May 26, 1916. New battery of 72 Collin regenerative coke ovens.

Improvements in By-product Coke Oven Practice (72536 A). G. P. Lishman. Read before Soc. of Chem. Ind. Ills. 2000 w. C G—July 28, 1916. Labor-saving devices.

Collieries

Underwood — A Modern Colliery (66861). C. M. Young. Ills. 5500 w. Cl A—Jan. 1, 1916. Up-to-date mine in the anthracite region.

The Loomis Colliery (68563). C. M. Young. Ills. 2500 w. Cl A—March 4, 1916. Modern breaker, Nanticoke, Penn.

The Oliphant-Johnson Coal Co.'s Mine No. 1 (68562). Ills. 2500 w. Cl A—March 4, 1916. Panel system.

Locust Mountain Colliery (69834). C. M. Young. Ills. 2500 w. Cl A—April 22, 1916. Anthracite mine at Shenandoah, Penna.

New Pits of the Carriden Coal Company, Bo'ness (73702 A). Ills. 2200 w. C G—Sept. 15, 1916. New colliery for

Consult Classification of the Index. See page 7.

Colliery Materials

under-sea mining. Difficulties encountered.

Colliery Materials

Iron and Steel for Colliery Work (69594 A). W. Simons. From a paper before the N. Staf. Inst. of Min. & Mech. Engrs. Also discussion. 5500 w. C G—March 31, 1916. Requirements of material used.

Notes on the Specifications of Iron and Steel Suitable for Colliery Use (71069 N). W. Simons, with discussion. 7000 w. I M E, Trans—May, 1916. Standards and qualities for special purposes.

Conservation

Coal Conservation (73533). F. D. Marshall. 2000 w. T E S—Aug. 25, 1916. Best methods of economical carbonization of coal.

Conveyors

Working Thin Seams of Coal by Conveyors (70446 A). P. E. Smallwood. Read before N. of Eng. Br. of Nat. Assn. of Col. Mgrs. 2500 w. I & C T R—April 28, 1916. Installations described. Brief discussion.

Efficiency

Economies in a Small Coal Mine (67437 D). Herbert A. Everest. 700 w. A I M E Bul—Jan., 1916. Value of mechanical devices, concentration, and supervision.

Electricity

Electrical Plant at Frickley Colliery (69708 A). H. Elliott. From a paper before Assn. of Min. Elec. Engrs. Also discussion. 6000 w. I & C T R—March 24, 1916. Details of plant and work.

Electricity in Coal Mining (73908). C. B. Davis. 2500 Cl A—Oct. 14, 1916. The uses for current.

Examination

Micro-Chemical Examination of Coal in Relation to Its Utilization (70751 A). J. Lamox. From paper before Manchester Geol. & Min Soc. 2000 w. C G—May 12, 1916. Serial, 1st part. A study.

Explosions

Experiments with Coal Dust at the Derne Gallery (65697 A). From *Glückauf*. 4000 w. Col Guard—Oct. 29, 1915. Experiments and results.

Explosions in Mines Committee: Seventh Report (66774 A). 10000 w. C G—Dec. 10, 1915. Effects of inhaling dusts applicable for stone-dusting in mines.

The Limits of Inflammability of Mixtures of Methane and Air (67373 N). G. A. Burrell and G. G. Oberfell. Ills. 25 pp. U S B M—Tech. paper 119. Study of causes; experiments on self-propagation of flame.

Notes on the Ignition of Explosive Gas Mixtures by Electric Sparks (67654 N). J. D. Morgan. Also discussion. 12 pp.

COAL AND COKE**Gas Producers**

Curves. I E E JI—Jan., 1916. Experimental study.

Disaster at Ravensdale, Wash. (68699). Ills. 2000 w. Cl A—March 11, 1916. Cause undetermined.

Explosion Near Kempton, W. Va. (68973). Plan. 3000 w. Cl A—March 18, 1916. Blown-out shot.

Influences of Incombustible Substances on Coal Dust Explosions (70022 A). A. S. Blatchford. 2500 w. C G—April 14, 1916. Experimental work on quenching effect of different substances.

Explosibility of Gases from Mine Fires (70266). George A. Burrell and George G. Oberfell. 25 pp. U S B S—Tech. paper 134. Results of observations.

The Influence of Incombustible Substances on Coal-Dust Explosions (71074 N). A. S. Blatchford, with discussion. 16 pp. I M E, Trans—May, 1916. Experimental work.

The Prevention of Explosions in Coal Mines (72389). James Ashworth. 1500 w. C M JI—Aug. 1, 1916. Notes on Mr. Wm. Shaw's paper on "Coal Dust, How It Affects the Mines of the Crow's Nest Pass."

The Season of Explosions (73245). J. W. Powell. 2500 w. Cl A—Sept. 16, 1916. Suggested precautions for reducing winter disasters.

Fire-Damp

Researches on Fire-Damp (67965 D). Enrique Hauser. Ills. 4500 w. A I M E, Bul—Feb., 1916. Properties of methane and the influence of different gases.

Researches on Fire-Damp (70308 D). Ills. 2500 w. A I M E, Bul—May, 1916. Discussion of Enrique Hauser's paper.

Firedamp Detector

A New Firedamp Detector (67498). George A. Burrell. Ills. 1500 w. Cl A—Jan. 22, 1916. Apparatus to supplement electric lamp.

Fires

Coal-Mine Fires (74044). R. V. Norris. Ills. 5500 w. Cl A—Oct. 21, 1916. Methods of fighting underground fires, and of prevention.

Gaseous Ignition

The Influence of Pressure on the Electrical Ignition of Methane (73292 A). W. M. Thornton. 2500 w. Eln—Sept. 8, 1916. Read before British Assn. Experiments. Important in coal mining.

Gas Producers

New Mechanical Gas Producer (71572). Ills. 1500 w. Pwr—July 4, 1916. All points of grate are given equal motion.

The Lymn-Rambush Mechanical Gas-Producer (72688 A). Ills. 1200 w. Eng—Aug. 11, 1916. Detailed description.

Consult Classification of the Index. See page 7.

Geology

COAL AND COKE

Kansas

Geology

The Formation of Coal-Seams in the Light of Recent Microscopic Investigations (66490 N). James Lomax. 2 parts. 2 plates, and discussion. 32 pp. I M E—Nov., 1915. Results of microscopic research.

Studies of the Geology of the Kent Coal Field (66775 A). E. A. Newell Arber. Also discussion. 6500 w. C G—Dec. 10, 1915. Serial. 1st part. The coal measure records of four borings.

The Basement Rocks of the Bunter, with Special Reference to the Inundation at the Coppice Colliery (68165 N). G. M. Cockin, with discussion. 3500 w. I M E, Trans—Jan., 1916.

The Coal Measures of the Croxteth Park Inlier (68167 N). George Hickling. 2000 w. I M E, Trans—Jan., 1916. Structure from borings.

Strata Contortions in the Forest of Dean (67940 A). Charles J. Morgan. Read before Nat. Assn. of Col. Mgrs. Ills. 1500 w. I & C T R—Jan. 21, 1916. Geological peculiarities.

Studies of the Geology of the Kent Coalfield—Part I: The Coal-Measure Records of Four Borings (68169 N). E. A. Newell Arber, with discussion. Plate. 22 pp. I M E, Trans—Jan., 1916. Detailed study.

The Geological Structure of the South Lancashire Coalfield (68168 N). George Hickling, with discussion. Ill. and plate. 22 pp. I M E, Trans—Jan., 1916. Preliminary investigation.

The Connection Between the Northwestern European Coal Fields (68453 A). X. Stainier. Abstract of paper before the Manchester Geol. & Min. Soc. 7500 w. C G—Feb. 11, 1916. Complex problem; conclusions.

Some Effects of Earth Movement on the Coal-Measures of the Sheffield District (South Yorkshire and the Neighboring Parts of West Yorkshire, Derbyshire, and Nottinghamshire). Part I (69049 N). William George Fearnside. 50 pp. I M E Trans—Feb., 1916. As affecting stratification.

The Connexion Between the North-Western European Coalfields (69741 N). X. Stainier. 50 pp. I M E, Trans—March, 1916.

Discussion of Dr. George Hickling's Papers on "The Coal-Measures of the Croxteth Park Inlier" and "The Geological Structure of the South Lancashire Coalfield" (69740 N). 2500 w. I M E, Trans—March, 1916.

Germany

Brown-Coal Mining in Germany (67955 D). George J. Young. Ills. 3500 w. A

I M E, Bul—Feb., 1916. Openpit and underground methods, preparation.

Gob Fires

Gob Fires at Leycett Collieries (70755 A). W. G. Peasegood, with discussion. Ills. 2200 w. I & C T R—May 12, 1916. Methods of dealing with them in gassy and dusty mines.

Haulage

Electricity in Coal Mine Haulage (72202 A). William P. Little. Ills. 5000 w. G E R—Aug., 1916. Serial, 1st part. Best practice.

Slope Haulage in Alabama (72311). E. B. Wilson. Ills. 1000 w. Cl A—Aug. 5, 1916. A slope of varying grade more than a mile long.

Illinois

Chemical Study of Illinois Coals (74195 N). S. W. Parr. Ills. 75 pp. U I, Bul 3—Oct., 1916. Methods of sampling, laboratory practice, analyses, etc.

Coal Resources of District VI (74196 N). Gilbert H. Cady. Ills. 85 pp. U I, Bul 15—Oct., 1916.

Specific Gravity Studies of Illinois Coal (74028 A). Merle L. Nebel. Ills. 45 pp. U I, Bul No. 89—July 3, 1916. Results of study of the effect of moisture, and methods of determining the specific gravity.

India

Coal Mining in India in 1914 (65698 A). 2500 w. Col Guard—Oct. 29, 1915. Information from report of G. F. Adams.

Inspection

Observations and Experiences in Mine-Inspection Work (66372). J. J. Rutledge. 3000 w. Cl A—Dec. 11, 1915. Coal mining on Indian lands in Oklahoma.

Inspectors

Duties of a Coal Mine Inspector (71123). P. A. Grady. 2000 w. Cl A—June 17, 1916.

Italy

I combustibili industriali ed il conflitto Europeo (67749 B). Domenico Meneghini. 1200 w. Ind—Jan. 16, 1916. Serial, 1st part. Relations of Italy as regards fuels in view of the war.

Jigging

Jigging Anthracite Coal (69394). E. E. Finn. Ills. 3000 w. Cl A—April 8, 1916. To obtain successful results.

Kansas

Kansas Fuels: Coal, Oil, Gas (67988 N). 45 pp. U K, Bul—March 15, 1915. I. Heating Values and Proximate Analysis of Coal. P. F. Walker and Walter Bohnstengel. II. Discussion of Sulphur Content of Bituminous Coal. Walter Bohnstengel. III. Economic Effects of Washing Coal from the State Mine. C. M. Young.

Kentucky

COAL AND COKE

Mining Plants

Kentucky

Southern Coking Coal of the Elkhorn District May Make Chicago Iron and Steel Center (66341). 3500 w. M Rd—Dec. 9, 1915. Importance of eastern Kentucky coal coking fields.

Lamps

Cost of Upkeep of Electric Safety Cap Lamps (68698). 1000 w. Cl A—March 11, 1916. Year's test.

Lancashire

Problems of the South Lancashire Coal Field (65921 A). Dr. George Hickling. Ills. 7000 w. Col Guard—Nov. 12, 1915. Serial, 1st part. Address to Manchester Geol. & Min. Soc. Structure, disturbances, influence on concealed outcrops.

Lignite

Economic Methods of Utilizing Western Lignites (69141 N). E. J. Babcock. Ills. 60 pp. U S B M—Bul. 89. Summary of investigations.

Distillation of Colorado Lignite (69544). A. J. Hoskin. Ills. 2000 w. Cl A—April 15, 1916. Denver plant.

The Carbonizing and Briquetting of Saskatchewan Lignite (70315 D). S. M. Darling. 1200 w. C M I, Bul—May, 1916. Summary of results, with conclusions.

The Lignite Field of Northwestern South Dakota (72077 A). Dean E. Winchester, C. J. Hares, E. Russell Lloyd, and E. M. Parks. Ills. & Maps. 160 pp. U S G S—Bul. 627. Geologic examination made in 1911 and 1912 for the purpose of classifying the area as coal land or non-coal land.

Lignite (73298 A). 1500 w. Eng—Sept. 8, 1916. Information of this industry in Germany.

Colliery Machinery Lubrication (73009 A). George R. Rowland, in *Lehigh Employes' Mag.* 3000 w. Mch W—Aug. 25, 1916. Important features.

Machine Mining

Dangers of Machine Mining in Anthracite Coal (70489). D. M. Harris. Ills. 1200 w. Cl A—May 20, 1916.

Mine Fires

Treating a Gob Fire in Northumberland (65699 A). Ills. 1200 w. Col Guard—Oct. 29, 1915. Methods used to combat it.

Sealing Off Mine Fires (66764). Joseph Cain. Ills. 3000 w. Cl A—Dec. 25, 1915. Care in construction and removal of seals.

Carbon Dioxide as an Agent in Extinguishing Mine Fires, with Special Reference to Its Application at the Senghenydd Colliery (71068 N). Edgar C. Evans, with discussion. 2 plates. 32 pp. I M E, Trans—May, 1916.

Fighting an Anthracite Mine Fire (70955). W. B. Richards. Ills. 4000 w. Cl A—June 10, 1916. At No. 9 colliery of Lehigh Coal and Navigation Co.

Mine Gas

Explosive Gas in Coal Mines (73010 A). Morton Tompkins. 2000 w. C G—Aug. 18, 1916. Opinions based on investigations in England.

Mining Methods

Output of Coal and the Use of Electricity in Mines (65626 A). 1800 w. Elec Rev, Lond—Oct. 22, 1915. Machine mining and other uses.

Mining by Concentration Method (67284). Ills. 2500 w. Cl A—Jan. 15, 1916. Method employed successfully in the Pittsburgh district.

Coal-Mining Methods in Utah (72310). A. C. Watts. Ills. 4000 w. Cl A—Aug. 5, 1916. Serial, 1st part. Present article describes the geology and conditions.

Mining Methods Employed in the Anthracite Field (73244). H. M. Crankshaw. Ills. 3000 w. Cl A—Sept. 16, 1916. Serial, 1st part. Procedure followed in the southern field in working the mammoth bed.

A Puzzle in Mining Costs (67873). J. F. K. Brown. 3500 w. Cl A—Feb. 5, 1916. Longwall mining of thin coal measure.

Modern American Coal-Mining Methods, with Some Comparisons (68163 N). Samuel Dean. Also discussion. Ills. and plate. 90 pp. I M E, Trans—Jan., 1916. Causes of efficiency.

Mining the Mammoth Vein with Steam Shovels (68210). D. C. Helms. Ills. 2500 w. Cl A—Feb. 19, 1916. Method at Nesquehoning colliery.

Methodical Pillar Drawing (69109). W. N. Wetzel. 4500 w. Cl A—March 25, 1916. Economical practice.

Modern American Coal-Mining Methods, with Some Comparisons (69737 N). 25 pp. I M E Trans—March, 1916. Discussion of Dean's paper.

Working a Steep Coal Seam by the Longwall Method (69937). S. H. Ash. Ills. 2500 w. Cl A—April 29, 1916. Advantages.

Panel Room-and-Pillar Mining (70096). A. G. Horrock. Ills. 2500 w. Cl A—May 6, 1916. Method and its advantages.

Discussion of Mr. Samuel Dean's Paper on "Modern American Coal-Mining Methods, with Some Comparisons" (71072 N). 10 pp. I M E, Trans—May, 1916. Criticism and suggestions.

Mining Plants

The Design of Bituminous Mining Plants (66654 B). William Archie Wel-

Consult Classification of the Index. See page 7.

Moisture

din. Also discussion. Ills. 75 pp. E S W P—Nov., 1915. Determining character and estimating cost.

A Plant for Thin-Seam Coal (70366). R. G. Read. Ills. 1000 w. Cl A—May 13, 1916. Descriptive.

Modern Mine-Plant Design (65558). M. L. Hyde. Ills. 4000 w. Coal Age—Nov. 6, 1915. Serial, 1st. part. Arrangement of surface works at coal mines.

Moisture

The Estimation of Moisture in Coal (73329 N). T. F. Winmill. 3000 w. I M E, Trans—Aug., 1916. Methods of estimating.

Montana

Geology and Coal Resources of Northern Teton County, Montana (67379 N). Eugene Stebinger. Maps. 140 pp. U S G S, Bul 621-K—Jan. 5, 1916. Value and quantity.

Geology and Coal Resources of Northern Teton County, Montana (68480 N). Eugene Stebinger. Maps. 40 pp. U S G S, Bul. 621-K—Jan. 5, 1916. Report on technical features.

Munitions

Coke-Oven Ammonia for Munitions (73817 B). J. W. Torrentine. 3500 w. Jl I & E C—Oct., 1916. Present domestic production of ammonia, and output possible under stimulus of emergency conditions.

Newfoundland

Newfoundland Coal Deposits (73431). J. W. McGrath. 2200 w. C M Jl—Sept. 15, 1916. Information concerning the deposits.

New Zealand

Coal Mining Under the River Waikato and Lake Hakanoa, N. Z. (73216 A). Map. 1500 w. C G—Sept. 1, 1916. From Chief Inspector's report. Particulars of under-water mining.

Nitric Acid

The Ostwald Process of Oxidizing Ammonia to Nitric Acid (73306 A). Fred C. Zeisberg. 6000 w. M & C E—Sept. 15, 1916. Condensation of literature concerning this process.

Nova Scotia

The Coal Trade of Nova Scotia in 1915 (67130). F. W. Gray. 2200 w. C M Jl—Jan. 1, 1916. Production.

The Coal Trade in Nova Scotia During the First Half of 1916 (71985). F. W. Gray. 1500 w. C M Jl—July 15, 1916. Approximate figures of output.

Oxfordshire

The Concealed Oxfordshire Coal Field (66776 A). Read before S. Staffs. and Warwickshire Inst. of Min. Engrs. 2500 w. C G—Dec. 10, 1915. Striking features, productiveness, etc.

COAL AND COKE**Powdered Coal**

The Concealed Oxfordshire Coalfield (68170 N). E. A. Newell Arber, with discussion. 4000 w. I M E, Trans—Jan., 1916. Recent borings; economic prospects.

Oxidation

The Absorption of Oxygen by Coal (73330 N). T. F. Winmill. 1500 w. I M E, Trans—Aug., 1916. Part VIII deals with the effect on the absorption of the size of the coal particles and the percentage of oxygen in the air.

The Absorption of Oxygen by Coal (73332 N). T. F. Winmill, with discussion. 36 pp. I M E, Trans—Aug., 1916. Part IX gives comparison of rates of absorption of oxygen by different varieties of coal.

Peat

Investigation of the Peat Bogs and Peat Industry of Canada, 1913-14 (71763 N). Aleph Anrep. Maps & Ills. 179 pp. C D M, Bul 11—No. 351.

Bacterized Peat—A New Fertilizer (71958 A). 3000 w. C P S, Jl—June, 1916. Peat as a carrier for bacteria; results of the use of humogen.

The Use of Peat in Commercial Fertilizers (71959 A). H. E. Wiedmann. 2800 w. C P S, Jl—June, 1916. Used as a source of nitrogen.

Philippines

The Persistence of Philippine Coal Beds (65838 N). Wallace E. Pratt. Ills. 3500 w. Philippine Jour of Sci—Sept., 1915. Quality, development, and general information.

Coal in the Philippines (68972). Wallace E. Pratt. Ills. 5500 w. Cl A—March 18, 1916. Commercial development unsuccessful.

Pittsburgh

New Operation in an Old Field (68212). C. M. Young. Ills. 2200 w. Cl A—Feb. 19, 1916. Unworked coal near Pittsburgh.

Powdered Coal

Powdered Coal as a Fuel in Malleable Shops (72990). Joseph Harrington. 1000 w. Fnd—Sept., 1916. Serial, 1st part. Requirements and results of the use in malleable melting furnaces and annealing ovens.

The Use of Powdered Coal as a Fuel (73341 D). Joseph Harrington. Ills. 3500 w. O S M E S E, Jl—Vol. VIII, No. 2. Pulverization, the burner, difficulties, advantages, etc.

The Use of Powdered Coal in Metallurgical Processes: A Discussion of the Engineering Principles Involved (73361 B). C. J. Gadd. Ills. 5500 w. F I, Jl—Sept., 1916. Essential features for success with this fuel.

See MECHANICAL ENGINEERING, *Steam Engineering*.

Consult Classification of the Index. See page 7.

Power**COAL AND COKE****Spontaneous Combustion****Power**

Practical Considerations Relative to Purchased Power (71526). H. P. Musser and F. B. Lamb. 1500 w. Cl A—July 1, 1916. Questions of cost.

Economical Production and Utilization of Power at Collieries (72292 A). F. F. Mairet, with discussion. From paper before Midland Inst. of Min., Civ., & Mch. Engrs. 7000 w. C G—July 21, 1916. Discusses steam, gas, electricity, etc.

Pulverized Coal

Pulverized Coal—Its Preparation and Use in Industrial Furnaces (67097 A). S. H. Harrison. Ills. 5000 w. E M—Feb., 1916. Highly economical results in applications other than power.

Pumping Plant

Colliery Pumping Plant in North Staffordshire (70345 A). Ills. & Plate. 1500 w. Enr—April 28, 1916. Centrifugal sets for high-lift pumping.

Colliery Pumping Plants (73024 A). C. Heal. 2500 w. I & C T R—Aug. 18, 1916. Types used.

Recovery Methods

River Coal 72137 A). Howard E. Moses. Ills. 1800 w. E S P, JI—June, 1916. Recovery of waste coal from rivers and streams in the anthracite region.

Replacement

A Record Replacement (69543). R. G. Miller. Ills. 1200 w. Cl A—April 15, 1916. Plant destroyed by fire rebuilt in less than two months.

Resources

Coal Resources of the United Kingdom (72615 A). Arnold Lupton. Read before S. Wales Inst. of Engrs. 5500 w. Mch E—Aug. 11, 1916. No cause for anxiety about the duration of coal supplies.

Reviews of 1915

Business Aspects of the Coal Industry in 1915 (67180). A. T. Shurick. 4000 w. Cl A—Jan. 8, 1916. Review; depression followed by expansion.

The Coal Trade of 1915 (67522 A). 33500 w. C G—Jan. 7, 1916. Review by districts, with editorial.

Reviews of Coal Mining in 1915 (67179). 2800 w. Cl A—Jan. 8, 1916. Reports from state mine inspectors.

The Coal and Coke Trades of the United Kingdom in 1915 (67342 A). 22000 w. I & C T R—Dec. 31, 1915. General and district reviews, with editorial.

Rhode Island

Rhode Island Coal (65655 N). George H. Ashley. Ills. & map. 55 pp. U S Geol Surv—Bul. 615. The coal, its use, and its mining.

Roof Cave

Cave at the Prospect Colliery (68390). C. M. Young. Ills. 1500 w. Cl A—Feb. 26, 1916. Due to pot-hole.

Roof Support

Controlling Roof Weights (67344 A). W. Dakin. Read before the Nat. Assn. of Col. Mgrs. Ills. 7000 w. I & C T R—Dec. 31, 1915. Methods in coal mines. Also discussion.

Discussion of Mr. W. H. Hepplewhite's Papers on "Substitutes for Wooden Supports of the Roof in Longwall Working," and "The Action and Control of Differently Constituted Coal-Roofs"; and of Mr. Frank N. Siddall's Paper Entitled, "Some Notes on Supporting the Roof in Coal Mines." (68164 N). Ills. 12 pp. I M E, Trans—Jan., 1916.

Safety Lamps

Firedamp Detector for Miners' Electric Safety Lamps (70344 A). T. J. Thomas. 3000 w. C G—April 28, 1916. Results of tests with Thomas gas detector.

Sampling

Report of Committee D-5 on Coal (71437 N). Ills. 10 pp. A S T M—June, 1916. Method for sampling.

Sampling Coal Deliveries (72873). C. C. Harp. 2500 w. N E—Sept., 1916. Collecting and preparing sample.

Screening

Shaker Screen Drive (68389). William H. McGann. Ills. 2500 w. Cl A—Feb. 26, 1916. Efficient means.

The Design for Shaker Screens (68041). C. C. Wright. Ills. 2500 w. Cl A—Feb. 12, 1916. Important factors.

Structural Features of a Coal-Screening Plant (69110). 1500 w. Cl A—March 25, 1916. Design.

Shot Firing

Shot Firing in Coal Mines by Electricity Controlled from Outside (67698 N). H. H. Clark, N. V. Breth and C. M. Means. 30 pp. U S B M—Tech. paper 108. Existing systems; essential features.

South America

Fuel Conditions in South America (67791 N). James W. Hardy. Ills. 17 pp. Int Ry Fuel Assn Pro—1915. General description of coal and oil fields; with discussion.

Spitzbergen

Coal Deposits at Spitzbergen (72584 A). Map. 1500 w. I & C T R—Aug. 4, 1916. The deposits and their development.

Spontaneous Combustion

Spontaneous Combustion of Coal (68675 A). J. F. Springer. 2500 w. R M E—March, 1916. Factors of importance.

Consult Classification of the Index. See page 7.

Steam Engines

The Prevention of Spontaneous Combustion of Coal (69396 A). J. F. Springer. 1500 w. R M E—April, 1916.

Steam Engines

The Steam Engine's Extravagance (72707). C. W. Crawford. 1200 w. Cl A—Aug. 26, 1916. Art of hoisting coal. Stone Dusting in Steam Coal Collieries (73732 A). G. D. Budge. Ills. 6000 w. C G—Sept. 22, 1916. Sources of mine dust; applying stone dust; analysis of results, etc.

Storage-Battery Locomotives

The Goodman Storage Battery Locomotives—Particularly the Articulated Type (67609). E. C. De Wolf. Ills. 1500 w. M & E W—Jan. 29, 1916. Details of new design.

Stripping

Steam-Shovel Coal Stripping in the Danville District (68697). Ills. 4000 w. Cl A—March 11, 1916. Types of machines in Illinois.

Surface Plant

Surface Plant at Brodsworth Main Colliery (73217 A). Ills. 1600 w. C G—Sept. 1, 1916. Detailed description.

Tipples

Simplicity in Tipple Design (67605). R. G. Miller. Ills. 1500 w. Cl A—Jan. 29, 1916. Details of steel structure in Pomeroy, Ohio.

New Tipple at Gloucester, Ohio (71529). Miner Raymond. Ills. 1100 w. Cl A—July 1, 1916. Remodeled to conform with Greene law.

Some Modern Coal Tipples (71524). Henry J. Edsall. Ills. 2500 w. Cl A—July 1, 1916. Serial, 1st part. Typical installations.

Track Layout at Mine Tipples (72088). E. A. Holbrook. Plan. 3000 w. Cl A—July 29, 1916. Arrangement and grades.

Trade

Coal and Shipping (71154 A). F. J. Warden-Stevens. Ills. 2500 w. C G—June 2, 1916. Serial, 1st part. The present article discusses the national value of coal and coal shipping.

Transfer Plant

East Broad Top Coal Transfer and Preparation Plant (69105). Henry J. Edsall. Ills. 2000 w. Cl A—March 25, 1916. Arranged on two-unit plan.

Turkey

Fuel in Turkey (70890 D). Leon Dominican. Map. 7500 w. A I M E, Bul—June, 1916. Localities at which fuel is known.

Utah

Features of Coal Mining in Utah, Principally in Carbon County (66231 A). A.

COAL AND COKE

C. Watts. Ills. 4500 w. C S M M—Dec., 1915. Paper before Rock. Mt. Coal Min. Inst.

Wales

The Pembrokeshire Coalfield (69886 A). Ills. 1200 w. I & C T R—April 7, 1916. Survey of western portion.

Mining and Dealing with Mine Water in the Mold Coalfield (72582 A). William Hapwood. Read before Nat. Assn. of Col. Mgrs. Ills. 2500 w. I & C T R—Aug. 4, 1916. The geology and working.

Washery

Coal Washery Plant at Normandy Park Steel Works (69589 A). Ills. 1200 w. C G—March 24, 1916. Detailed description.

Washing

Economics in Coal Washing (70023 A). Sherwood Hunter. From paper before the Manchester Geol. & Min. Soc. 2500 w. C G—April 14, 1916. Methods discussed.

Economics in Coal-Washing (71070 N). Sherwood Hunter, with discussion. Ills. 5400 w. I M E, Trans—May, 1916. Economics in washing, and in layout of plant. "British Baum" Coal Washing Plant (72534 A). Ills. 1800 w. C G—July 28, 1916. The washery at Wombwell Colliery.

Waste

Criminal Coal Wastage and Its Prevention (72726 A). Ills. 6500 w. E Rv—Aug. 15, 1916. Serial, 1st part. Wasteful practices and their remedy.

The Waste of Coal (72774). 1400 w. T E S—July 28, 1916. Extracts from papers before Society Chemical Industry, Edinburgh meeting.

Waste in Coal Production (72535 A). Henry Louis. From paper before Soc. of Chem. Ind. 2500 w. C G—July 28, 1916. Waste that can be avoided.

Water Content

Some Properties of the Water in Coal (70265). Horace C. Porter and O. C. Ralston. 25 pp. U S B M—Tech paper 113. How properties of coal are affected.

The Effect of the Presence of Moisture in Gas Coke Fuel (70016 A). Pakenham Beatty and A. F. Smith. 1600 w. El R—April 14, 1916. Loss of boiler efficiency.

Western Australia

The Coal Resources of Western Australia (69677 N). H. P. Woodward. Ills. 7 pp. Maps. Geol Sur W Aust—Bul 64, Rept 52. General survey.

Winding

Koepe Winding at Plenmeller Colliery (72301 A). Ills. 1800 w. I & C T R—July 21, 1916. Details of winding gear.

Consult Classification of the Index. See page 7.

Alaska

Alaska

Mineral Resources of the Upper Chitina Valley, Alaska (72393). Fred H. Moffit. Map. 7 pp. U S G S—Bul. 642-C. The geography, geology and mineral resources.

The Turnagain-Knik Region, Alaska (72394 N). Stephen R. Capps. Ills. 47 pp. U S G S—Bul. 642-E. Geological investigation.

Analysis of Slate and Dike (68567). E. E. White. 1500 w. E & M J—March 4 1916. Difficulty of distinguishing. Method.

Arizona

The Mineralization at Clifton-Morenci (73764 B). Louis E. Reber, Jr. Ills. 45 pp. E G—Aug.-Sept., 1916. Study of sources of material and geology.

Bibliography

Bibliography of North American Geology for 1915., with Subject Index (72597 N). John M. Nickles. 140 pp. U S G S—Bul. 645.

Bingham

The Disseminated Copper Ores of Bingham Canyon, Utah (65530 D). J. J. Beeson. Ills. 9500 w. Am Inst of Min Engrs, Bul—Nov., 1915. Country rock and alterations, and processes of secondary enrichment.

Black Hills

Black Hills Gold-Bearing Iron-Quartz—Tremolite Belt (69971). B. M. O'Hara. Excerpt from thesis at S. Dak. Sch. of Mines. Ills. 2500 w. E & M J—April 29, 1916. Geological description.

Britain

Economic Geology in Britain (74093 A). W. S. Boulton. Presidential address. 5500 w. C G—Oct. 6, 1916. The work of the Geological Survey; development of visible and concealed coalfields.

Broken Hill

Observations on the Geology of the Broken Hill Lode, New South Wales (72033 B). E. S. Moore. Ills. 22 pp. E G—June, 1916. The pre-Cambrian rocks; petrography of the lode and country rocks; ore bodies, etc.

Butte

The Occurrence of Covellite at Butte, Mont. (66420 D). 3500 w. A I M E Bul—Dec., 1915. Discussion of A. Perry Thompson's paper.

Canada

Summary Report of the Geological Survey Department of Mines, for the Calendar Year 1915 (70867 N). Maps. 300 pp. C D M—No. 1616.

Geology and Ore Deposits of Rossland, British Columbia (70865 N). Charles

GEOLOGY

Fire Brick

Wales Drysdale. Ills. & Maps. 300 pp. C D M—Mem. 77. Results of geological field work.

Geology of Field Map-area, B. C. and Alberta (70864 N). John A. Allan. Ills. & Maps. 300 pp. C D M—Mem. 55. Research. Physiography; stratigraphical and igneous geology; economic geology, etc.

Ore Deposits of the Beaverdell Map-Area (70866 N). Leopold Reinecke. Ills. & Maps. 170 pp. C D M—Mem. 79. Topography; general and economic geology, etc.

Chalcocite

Observations on Certain Types of Chalcocite and Their Characteristic Etch Patterns (67959 D). C. F. Tolman, Jr. Ills. 5000 w. A I M E, Bul—Feb., 1916. Results of investigation.

Observations on Certain Types of Chalcocite and Their Characteristic Etch Patterns (70302 D). 2000 w. A I M E, Bul—May, 1916. Discussion of Tolman's paper.

Clay Slips

The Origin of Clay Slips (72036 B). W. B. Wilson, 9 pp. E G—June, 1916. Theory concerning clay filled fissures cutting a coal seam.

Colloidal Migration

The Role of Colloidal Migration in Ore Deposits (69771 B). John D. Clark. and P. L. Menaul. 1200 w. E G—Jan., 1916. Experimental work.

Copper Indications

Surficial Indications of Copper (70231). Frank H. Probert. Ills. 3000 w. M & S P—May 6, 1916. Serial, 1st part. On outcrops; coloring, weathering, metamorphism, etc.

Copper Sulphides

The So-Called Graphic Intergrowth of Bornite and Chalcocite (73765 B). Austin F. Rogers. Ills. 12 pp. E G—Aug.-Sept., 1916. Investigations and results.

Cuba

See same heading under *Iron and Steel*.

Enrichment

Laboratory Studies on Secondary Sulphide Ore Enrichment (72034 B). S. W. Young and Neil Preston Moore. Ills. 16 pp. E G—June, 1916. Investigations on the synthesis of copper sulphide minerals and their decompositions.

Fire-Brick

Metal Oxide and Sulphide Impregnation of Fire-Brick (66296 B). N. B. Davis. Ills. 2500 w. E G—Nov.-Dec., 1915. Microscopic examination of specimens. Possible relation to certain ore deposits.

Consult Classification of the Index. See page 7.

Gold-Quartz Replacements**Gold-Quartz Replacements**

Gold-Quartz Replacements in Intrusive Rock (68228). John F. McLennan. 3000 w. M & E W—Feb. 19, 1916. Chiefly at head waters of Feather River.

Igneous Rocks

The Later Stages of the Evolution of the Igneous Rocks (67392 N). N. L. Bowen. 90 pp. JI G—Nov.-Dec., 1915. (Sup.) New conception of origin.

Iron Ore

The Age of the Iron Ore in Eastern Wisconsin (67991 B). T. E. Savage and C. S. Ross. Ills. 1800 w. A JI S—Feb., 1916. Geological study.

Iron Pyrites

Iron Pyrites Deposits in Southeastern Ontario, Canada (72254 D). P. E. Hopkins. Map. 8 pp. A I M E, Bul—Aug., 1916. Brief description of all known pyrite deposits in the area, and two working mines.

Iron Ranges

A Revision of the Sequence and Structure of the Pre-Keweenaw Formations of the Eastern Gogebic Iron Range of Michigan (67391 N). R. C. Allen and S. P. Barrett. Also discussion of correlation. C. K. Leith and R. C. Allen. Map. 40 pp. JI G—Nov.-Dec., 1915. Results of recent studies.

Joplin

Origin of the Zinc and Lead Deposits of the Joplin Region, Missouri, Kansas and Oklahoma (66795 N). C. E. Sieben-thal. Maps & Ills. 264 pp. U S G S—Bul 606. Decisions based on extensive study.

Kyshtim

The Pyritic Copper Deposits of Kyshtim, Russia (66293 B). A. W. Stickney. 11700 w. E G—Nov.-Dec., 1915. Detailed description, and features of mineralization.

Magmatic Differentiation

Magmatic Differentiation in Effusive Rocks (67966 D). Sidney Powers and Alfred C. Lane. 4000 w. A I M E, Bul—Feb., 1916. Results of investigation.

Manganese

The Oxidation of Manganese Solutions in Presence of the Air (70495 B). Victor Lenher. 900 w. E G—March-April, 1916. Experimental study.

Maryland Copper

A Metallographic Study of the Copper Ores of Maryland (70497 B). Robert M. Overbeck. Ills. 8500 w. E G—March-April, 1916. Deposits and history.

Microscopy

Microscopical Aspect of Some Ores (70514). James Scott. Ills. 1500 w. B W—May, 1916. Copper, silver, and lead ores.

GEOLOGY**Porcupine****Montana**

Geology of the Hound Creek District of the Great Falls Coal Field, Cascade County, Montana (73870 N). V. H. Barnett. Map. 16 pp. U S G S, Bul 641-H—Oct. 9, 1916. Information regarding the coal resources and geological structure.

New Mexico

Origin of Copper Ores of the "Red Beds" Type (72035 B). Austin F. Rogers. Ills. 15 pp. E G—June, 1916. Study of the ores from the Sierra Oscura, New Mexico.

Oklahoma

An Anticlinal Fold Near Billings, Noble County, Oklahoma (71956). A. E. Fath. Maps. 18 pp. U S G S, Bul 641-E—July 15, 1916. Investigations, geology, development, oil and gas lands, etc.

Ore Persistence

Theoretical Considerations Governing the Persistence of Ore (67413). T. A. Rickard. Ills. 4000 w. From a paper presented to the Inst. M. & M., London, with additions. Chief arguments against such persistence.

Petroleum

The Relations of the Chemical Composition of Petroleum to Its Genesis and Geologic Occurrence (73763 B). Charles F. Mabery. 16 pp. E G—Aug.-Sept., 1916. Results of investigation.

Philippines

Geologic Reconnaissance in Caramoan Peninsula, Camarines Province (65839 N). Wallace E. Pratt. Ills. 17 pp. Philippine Jour of Sci—Sept., 1915. Geography and general and economic geology.

Notes on a Geologic Reconnaissance of Mountain Province, Luzon, P. I. (65833 N). Warren D. Smith. Ills. 30 pp. Philippine Jour of Sci—May, 1915. Geography, geology, and general information.

Notes on the Geology of Panay (65834 N). Warren D. Smith. Ills. 18 pp. Philippine Jour of Sci—May, 1915. Geology, and general information.

Phosphorus

The Geologic Role of Phosphorus (73746 A). Eliot Blackwelder. 5000 w. A JI S—Oct., 1916. Part played by phosphorus in geologic process.

Polished Sections

See metallography under **MECHANICAL ENGINEERING, Measurement.**

Porcupine

Geological Features of the Porcupine Gold Area (70212). A. G. Burrows. Ills. 4000 w. C M JI—May 1, 1916. Rocks, deposits, occurrence, etc.

Consult Classification of the Index. See page 7.

Queensland

Queensland

Copper Deposits of the Wide Bay and Burnett Districts (67445 N). Lionel C. Ball. 2500 w. Q G M JI—Dec. 15, 1916. Describes the different localities.

Rock Gas

The Composition of the Rock Gas of the Cripple Creek Mining District, Colorado (70296 D). George A. Burrell and Alfred W. Gauger. 20 pp. A I M E, Bul—May, 1916. Composition, chiefly nitrogen.

Secondary Enrichment

Interpretation of Assay Curves for Drill Holes (67944 D). Edward H. Perry and Augustus Locke. Curves. 2000 w. A I M E, Bul—Feb., 1916.

Sericite

Sericite a Low Temperature Hydrothermal Mineral (70496 B). Ills. 9000 w. E G—March-April, 1916. Properties and characteristics of this mineral.

Strata Calculations

Monographic Solutions of Certain Stratigraphic Measurements (69769 B). Harold S. Palmer. 3000 w. E G—Jan., 1916. Method for calculating thicknesses.

Sudbury

Origin of Sudbury Nickel-Copper Deposits (70204). Cyril W. Knight. Map. 1500 w. E & M J—May 6, 1916. Disputes old theory.

Sulphide Intergrowths

The Paragenesis of Certain Sulphide Intergrowths (69768 B). W. L. Whitehead. Ills. 3000 w. E G—Jan., 1916. Study of chemistry and structure.

Sulphides

Sulphide Deposits at Flin-Flon and Schist Lakes, Manitoba (73820). From report by R. C. Wallace. 1800 w. C M JI—Oct. 1, 1916. Geology and deposits.

Texas

Copper Deposits in the "Red Beds" of Texas (66294 B). Louis M. Richard. 5500 w. E G—Nov.-Dec., 1915. Location, geology, occurrence, etc.

Tonopah

Geology and Ore-Deposition at Tonopah, Nevada (68682 B). J. E. Spurr. Ills. 57 pp. E G—Dec., 1915. Modifications, from recent study.

IRON AND STEEL

Austria

Utah

Geology of the Cottonwood Districts (69554). L. O. Howard. Maps. 4000 w. M & S P—April 15, 1916. Structure and ore deposits.

Geology and Coal Resources of Castle Valley in Carbon, Emery, and Sevier Counties, Utah (70873). Charles T. Lupton. Ills. & Maps. 80 pp. U S G S—Bul. 628. Geography, surface features, geology.

Vancouver

A Peculiar Type of Ore from the Tye Copper Deposit of Vancouver Island (72037 B). Victor Dolmage. Ills. 5 pp. E G—June, 1916. A copper-silver ore.

Wabana Ore

Origin of the Wabana Iron Ore (68412 N). Albert O. Hayes. Ills. 5800 w. C M I, Trans—1915. Study and conclusions; bibliography.

War Geology

Kriegsgeologie und ihre Beziehungen zur montanistischen Praxis (65408 B). Friedrich König. 3500 w. Mn Rnd—Sept. 16, 1915. Explanation of new science of "war geology" and its relation to mining.

Warren District

Geology of the Warren Mining District (73258 D). Y. S. Bonillas, J. B. Tenney, and Leon Fenchère. Ills. 68 pp. A I M E, Bul—Sept., 1916. Results of observations relating to the ore deposits.

Witwatersrand

Conditions of Deposition of the Witwatersrand System (65995 A). E. T. Mellor. Ills. 8 pp. Min Mag—Nov., 1915. From advanced proofs or article read before Geol. Soc. of South Af. Conclusions from official geological survey.

The Far East Rand (66275 A). E. T. Mellor. Ill. 8 pp. M Mg—Dec., 1915. General geological description and economic importance.

The Conglomerates of the Witwatersrand (68688 N). E. T. Mellor. Ills. 62 pp. I M M, Bul 137—Feb. 17, 1916. Origin of the gold.

The Conglomerates of the Witwatersrand (70435 N). E. T. Mellor. Ills. 25 pp. C M M S S A, JI—Feb., 1916. Geological aspects; favors placer theory.

IRON AND STEEL

Analysis

Determination of Carbon in Steels and Irons by Direct Combustion in Oxygen at High Temperatures (68752 N). J. R. Cain, and H. E. Cleaves. Ills. 10 pp. U S B S, Tech. paper No. 69—Feb. 18, 1916. Experimental work and results.

The Determination of Gases in Steel (69075 A). 1000 w. I A—March 23, 1916. Method of Goerens and Paquet, as described in *Stahl und Eisen*.

Austria

The Austrian Steel Industry in War

Consult Classification of the Index. See page 7.

Belgium

Time (70086 A). 2000 w. Enr—April 21, 1916. From recent reports.

Belgium

The Steel Industry of Belgium (70591 A). H. H. Campbell. 2500 w. I A—May 25, 1916. Past and future.

Bessemer Process

The Passing of the Acid Bessemer (72432 A). H. H. Campbell. 2000 w. I A—Aug. 10, 1916. Phases of its career.

The Place of the Basic Bessemer Process (73559 A). H. H. Campbell. 2500 w. I A—Sept. 28, 1916. Its extra costs and the reasons for Germany's pre-eminence as a producer.

Blast-Furnace Gas

Utilization of Blast Furnace Gas (65682). A. N. Diehl. Read at Cleveland meeting of Iron & Steel Inst. 2500 w. Ir Trd Rev—Nov. 11, 1915. Serial, 1st. part. Modern methods.

Blast-Furnace Operation

Coal and Coke Efficiency in Blast Furnace Operation (67644). Berger F. Burman. 2000 w. M & C E—Feb. 1, 1916. Serial, 1st part. Determining efficiency.

Calculations with Reference to the Use of Carbon in Modern American Blast Furnaces (68530 D). Henry Phelps Howland. 6500 w. A I M E, Bul—March, 1916. Why one coke is better than another.

The Raw Materials of the Blast Furnace (68786). J. E. Johnson, Jr. 6000 w. M & C E—March 15, 1916. 2nd article of a serial. Iron ores.

Blast-Furnace Working and the Function of Slags (69710 A). J. E. Fletcher. Abstract of paper read before Staffordshire Ir. & St. Inst. 3000 w. I & C T R—March 31, 1916. Charging methods.

The Operation of the Blast Furnace (69275). J. E. Johnson, Jr. Ills. 10,000 w. Third article of a serial. M & C E—April 1, 1916. Slags.

Burdening the Blast Furnace (69722). J. E. Johnson, Jr. 9800 w. M & C E—April 15, 1916. Controlling quantities of the different elements.

The Available Hearth Heat of the Blast Furnace (69277). Alex. L. Field. 3000 w. M & C E—April 1, 1916. Critical discussion of articles by Johnson.

Blast Furnace Operation (70391). J. E. Johnson, Jr. 11500 w. M & C E—May 15, 1916. Casting and flushing furnace, blowing in, blowing out, etc.

The Calculation of the Burden of the Blast Furnace (69976). J. E. Johnson, Jr. 5500 w. M & C E—May 1, 1916.

Measurement of the Temperature Drop in Blast-Furnace Hot-Blast Mains

IRON AND STEEL**Blast-Furnaces**

(70303 D). 2500 w. A I M E, Bul—May, 1916. Discussion of paper of R. J. Wysor.

Ueber die Verwendung von Rohkohle im Hochofenbetrieb (70118 B). D. Fr. Lange. Ills. 2000 w. St u E—Apr. 20, 1916. Notes on the use of raw coal in blast furnaces.

Calculations with Reference to the Use of Carbon in Modern American Blast Furnaces (71760 D). 6 pp. A I M E, Bul—July, 1916. Discussion of H. P. Howland's paper.

Blast-Furnace Practice

Ueber die Zumischung von Sauerstoff zum Gebläsewind der Hochöfen (65424 B). Hermann Blome. Ills. 2400 w. St u E—Oct. 7, 1915. Results obtained by introducing oxygen into the blast-furnace blast.

The Mechanical Principles of the Blast Furnace (66946). J. E. Johnson, Jr. Ills. 6500 w. M & C E—Jan. 1, 1916. Effects of blast pressure.

Blast Furnaces

Completes First of New Furnaces (67127 B). Samuel Higginson. Ills. 2000 w. I T R—Jan. 6, 1916. At Steelton works.

A Complete Blast Furnace in 85 Days (71053 A). Ills. 700 w. I A—June 15, 1916. No. 9 stack of Cambria Steel Co., Johnstown, Pa.,

Distribution of Raw Materials in the Blast Furnace (70717 A). George W. Vreeland, with discussions. Ills. 5500 w. I A—June 1, 1916. Read before Am. Ir. & St. Inst. Bad distribution and the remedy; improved operation.

The Distribution of the Charge Column and of the Ascending Gas Column (70735). J. E. Johnson, Jr. Ills. 10000 w. M & C E—June 1, 1916. Serial number on iron blast furnace operation.

Handling the Blast Furnace Charge (71259). K. L. Landgrebe. Ills. 2000 w. I T R—June 22, 1916. Discussion of the paper by George W. Vreeland before Am. Ir. & St. Inst. Stages of development of the distributing top.

Blast Furnace Irregularities and Their Treatment (71806). J. E. Johnson, Jr. Ills. 8500 w. M & C E—July 15, 1916. Outline of methods.

The Rate of Driving the Blast Furnace (71577). J. E. Johnson, Jr. 5500 w. M & C E—July 1, 1916. Effects on the descent of charge, the fuel consumption, etc.

Oxygen Gas in Blast-Furnace Operations (72647 A). David F. Baker. 1800 w. I A—Aug. 24, 1916. Examples of its effective use.

Blast Furnace Products (73311 A). J. E. Johnson, Jr. 5000 w. M & C E—Sept.

Blowing Engines

15, 1916. Deals with steel-making and puddling irons and ferro alloys.

Commercial Considerations Concerning the Blast Furnace (72972 A). J. E. Johnson, Jr. 11,500 w. M & C E—Sept. 1, 1916. Economic questions of iron production.

Safe Practice at Blast Furnaces (73553 A). Frederick H. Willcox. Ills. 65 pp. U S B M—Tech. paper 136. A manual for foremen and men. Dangers and their avoidance.

The Proper Blast for an Efficient Air Furnace (72991). Harold Hemenway. 1000 w. Fnd—Sept., 1916. How best results may be obtained.

Late Blast-Furnace Designs (73830). Ills. 1000 w. E & M J—Oct. 7, 1916. Details of recent designs.

Blowing Engines

See MECHANICAL ENGINEERING, *Power and Transmission*.

British Columbia

The Iron and Steel Industry in British Columbia (73022 A). James Ashworth. Ills. 1800 w. I & C T R—Aug. 18, 1916. Brief review of the history and development.

Canada

The Production of Iron and Steel in Canada During the Calendar Year 1914 (66553 N). John McLeish. 35 pp. C D M—No. 349. Statistics.

Canadian Supplies of Iron and Steel in Relation to Munitions of War (67426). Thomas Cantley. 3000 w. C M JI—Jan. 15, 1916. Present conditions of industry, and development.

Chile

Das Eisenerzvorkommen von Tofo bei Coquimbo in Chile (65489 B). B. Simmersbach. 2200 w. Gla Ann—Nov. 1, 1915. General description of the Tofo iron mines in Chile, owned by Bethlehem.

China

The Hanyang Iron and Steel Works (67937 A). Ills. 2500 w. Enr—Jan. 21, 1916. Serial, 1st part. History and description of works and mines.

Cold-Rolling

Cold-Rolling Strip Steel (72863 A). Edward K. Hammond. Ills. 4500 w. Mch—Sept., 1916. Methods at Floral Park, Somerville, N. J.

Conservation

Conservation of Iron Ore (67947 D). C. K. Leith. 1800 w. A I M E, Bul—Feb., 1916. Formulation of philosophy.

Converters

The Basic-Lined Converter in the Southwest (73265 D). L. O. Howard. 1400 w. A I M E, Bul—Sept., 1916. Working conditions and results.

IRON AND STEEL**Cuba**

The Genesis and Relations of the Daiquiri and Firmeza Iron-Ore Deposits, Cuba (68533 D). Joseph T. Singewald, Jr. and Benjamin Leroy Miller. 3000 w. A I M E, Bul—March, 1916. Conclusions from geologic study of these magnetite-nematite deposits.

The Iron Deposits of Daiquiri, Cuba (70301 D). 2500 w. A I M E, Bul—May, 1916. Discussion of paper of Lindgren and Ross.

Geology of the Iron-Ore Deposits of Firmeza District, Oriente Province, Cuba (73740 D). Max Roesler. Ills. 50 pp. A I M E, Bul—Oct., 1916. Geological occurrence of deposits on coast of Cuba.

Cuyuna

Matters of Interest to Operators Regarding the Cuyuna District (66658 N). Carl Zapffe. Map. 3000 w. L S M I—Vol. XV. General description.

Concentration of Cuyuna Ores (66659 N). Edmund Newton. Ills. 3500 w. L S M I—Vol. XX. Possible methods of beneficiation.

Dry Blast

The Dry Blast in the Manufacture of Iron and Steel (68349 A). Ills. 3000 w. Eng—Feb. 11, 1916. Serial, 1st part. Divergent results; explanation.

Elastic Limit

Sur la Limite Elastique de l'Acier (74234 C + D). Belaiew and Goudtsow. Ills. 8000 w. Effect of heat treatment on properties of steel.

Electric Furnaces

The Electric Furnace in Steel Manufacture (70716 A). John A. Mathews, with discussions. 4500 w. I A—June 1, 1916. Read before Am. Ir. & St. Inst. Development of electro-metallurgy; types of furnaces; processes, etc.

See also same heading, under ELECTRICAL ENGINEERING, *Electro-Chemistry*.

Electrometallurgy

Steel Making in the Electric Furnace (65942 A). James H. Gray. 1800 w. Ir Age—Nov. 25, 1915. From a paper read at Int. Engng. Cong. Growth of the industry; savings effected.

Electrothermic Smelting of Iron Ores in Sweden (65842 N). Alfred Stansfield. Ills. 59 pp. Canada Dept of Mines—No. 344. Economic commercial operation of the iron-smelting furnaces.

Stoff- und Wärmebilanz des Elektro-Roheisenofens (66208 B). Bernhard Neumann. 4000 w. St u E—Nov. 11, 1915. Economy of the electric pig-iron furnace in heat and material.

The Electric Steel Industry's Present Status (67116 B). 2500 w. I A—Jan. 6, 1916. Review of progress since 1910.

Consult Classification of the Index. See page 7.

England

IRON AND STEEL

Iron Ores

Ueber Entschwefelung bei der Roheisendarstellung (67054 B). Ludvig M. Lindeman. Ills. 4000 w. St u E—Dec. 16, 1915. Experiments on desulphurization of pig iron conducted in the electric furnace.

Operating Data on an Important Electric Furnace Installation (68398). W. J. Kyle. Ills. 2200 w. El R & W E—Feb. 26, 1916. Advantages of electric steel, shown in Easton plant.

Some Faults of the Small Electric-Arc Furnace for Melting and Refining Steel (69669 N). W. M. McKnight. 4 pp. A El S—April, 1916. Brief summary.

England

The Steel Industry of Great Britain (70038 A). H. H. Campbell. 2500 w. I A—May 4, 1916. Status and future.

Erosion in Guns

Erosione Dei Cannoni D'Acciaio Per Effetto Dei Gas Della Pulvere (72785 B). Ills. 2400 w. Ind—July 27, 1916. Erosion of steel cannon by powder gases. Results of recent experience.

Ferro-Manganese

Development of Ferro Manufacture (67118 B). C. J. Stark. Charts. 2000 w. I T R—Jan. 6, 1916. History in United States.

Supplies of Ferromanganese (73854 A). 1500 w. I A—Oct. 12, 1916. Apparent supply still adequate.

France

Outlook for the Steel Industry of France (70460 A). H. H. Campbell. 2500 w. I A—May 18, 1916. French exports may increase.

Future Development

The Steel Industry of Europe After the War (69745 A). H. H. Campbell. 2500 w. I A—April 20, 1916. Position of different nations.

The Rise of the British Iron Industry (69893 A). H. H. Campbell. 2500 w. I A—April 27, 1916. Factors contributing to her prominence.

Gas Burners

Burner Shifts to Meet Varying Conditions (72222). Charles C. Lynde. Ills. 1500 w. B F & S P—Aug., 1916. Types of service met by blast furnace gas burners.

Gas Fuel

Economies Effected by Washed Stack Gas (73690). Charles C. Lynde. Ills. 2000 w. B F & S P—Oct., 1916. Improved economy with blast furnace gas.

Gas Washing

Washing Blast Furnace Gas at South Chicago (67110 B). Ills. 2500 w. I A—Jan. 6, 1916. Method for total yield.

Germany

Germany's Position in the Steel Industry (70284 A). H. H. Campbell. 3000 w. I A—May 11, 1916. Best developed districts; raw materials.

Heat Treatment

Heat Treatment of Steel (72504 A). George Hutton. Second prize article. 1000 w. R M E—Aug., 1916. Directions.

Le Traitement Thermique du Bronze d'Aluminium (74233 C + D). Porterin and Arnou. Ills. 1900 w. R Met—March-April, 1916. Tensile strength, elongation, etc., of aluminum bronze.

The Influence of Heat Treatment on the Thermo-Electric Properties and Specific Resistance of Carbon Steels (73968 N). Edward D. Campbell. Curves. 18 pp. Ir & St Inst—Sept., 1916. Changes in the chemical constitution.

Ingots

Segregation and Sponginess in Ladle Test Ingots (65887 N). Robert W. Hunt Co. Ills. 1400 w. Am Ry Engng Assn, Bul—Sept., 1915. Results of investigations.

Controlling Piping and Segregation (69921). Henry M. Howe. Ills. Also discussion by E. F. Kenney. 5500 w. I T R—April 27, 1916.

The Manufacture of Large Forging Ingots (70285 A). Robert C. Woodward. Ills. 2500 w. I A—May 11, 1916.

Some Properties of Ingots (73967 N). A. W. & H. Brearley. Ills. 34 pp. Ir & St Inst—Sept., 1916. The principles of ingot-making.

Steel Ingot Defects (73970 N). J. N. Kilby. Ills. 1000 w. Ir & St Inst—Sept., 1916. Principles affecting acid and basic open-hearth steel and Bessemer steel. Introductory paper.

The Production of Sound Steel Ingots (73726 A). Ills. 1800 w. I A—Oct. 5, 1916. Results of modern practice.

See Rails.

Internal Stress

Comment on Décèle les Efforts Internes Dans les Metaux (74238 B). H. Volta. Ills. 1800 w. La Nt—Oct. 7, 1916. Optical method for determination of internal stress in metals.

Iron Concentration

Nashvauk Iron-Washing Plants (73749). L. A. Rossman. Ills. 1800 w. E & M J—Sept. 16, 1916. Iron-concentrating plants on the Mesabi Range.

Iron Ores

Iron Ores Explain Belgium and Verdun (72427). Ills. 3000 w. M Rd—Aug. 10, 1916. Germany's effort to dominate iron and steel.

Consult Classification of the Index. See page 7.

Italy

Italy

La sidérurgie Italienne (65984 B). Ills. 2000 w. *La Nat*—Nov. 13, 1915. Brief review of the development of the steel industry in Italy.

Malleable Iron

Variable Factors in Malleable Iron Production (70073). L. E. Gilmore. 2000 w. *Fnd*—May, 1916.

Manganese

Manganese Ores of the Bukovina (73971 N). Herbert K. Scott. Maps. 17 pp. *Ir & St Inst*—Sept., 1916. Deposits in Austria and their development.

Menominee

Iron Mining on the Menominee (67451). H. Cole Estep. Ills. 4000 w. *I T R*—Jan. 20, 1916. Story of development of Porter lands.

Mesabi

Recent Geologic Developments on the Mesabi Iron Range, Minnesota (73739 D). J. F. Wolff. Ills. 24 pp. *A I M E Bul*—Oct., 1916. Subdivisions of the iron-formation and special features.

Meteoric Iron

The Use of Meteoric Iron by Primitive Man (73975 N). George Frederick Zimmer. Ills. 44 pp. *Ir & St Inst*—Sept., 1916. Earliest history of iron.

Methods

Quarrying and Shipping Iron Ore (74116 N). 2000 w. *M & E R*—Sept., 1916. Description of Broken Hill Proprietary Co.'s works in South Australia.

Newfoundland

The Iron Mines of Wabana, Newfoundland (71610). J. W. McGrath. 2200 w. *C M J*—July 1, 1916. Discovery, ore deposits, mining methods, etc.

Nickel Ores

Chrome-Nickel Iron and Steel Products (73855 A). Leonard Waldo. From report for the Moa Bay Iron Co. 2500 w. *I A*—Oct. 12, 1916. Possibilities of development of ores from Cuba.

Nickel Steel

Notes on Nickel Steel Scale and on the Reduction of Solid Nickel and Copper Oxides by Solid Iron (73972 N). Dr. J. E. Stead. Ills. 1200 w. *Ir & St Inst*—Sept., 1916. Investigations.

Openhearth Steel

Improved Open-Hearth Checker Construction (67416 A). Ills. 1200 w. *I A*—Jan. 20, 1916. Improvement in output of ingots due to Danforth design.

Eine bemerkenswerte Neuerung im Betriebe des Martinofens (67768 B). Karl Kniepert. Ills. 2500 w. *St u E*—Jan. 13, 1916. Important advantages of patented head for openhearth furnace. Builds Open Hearths at Youngstown

IRON AND STEEL

Pittsburgh

(68366). R. V. Sawhill. Ills. 4000 w. *I T R*—Feb. 24, 1916. New plant and equipment.

An Improvement in Open Hearth Practice (70459 A). Ills. 800 w. *I A*—May 18, 1916. From an article by K. Kniepert, in *Stahl und Eisen*. Practice in Austria-Hungary.

Evolution of American Open-Hearth Practice (72855 A). H. H. Campbell. 2500 w. *I A*—Aug. 31, 1916. Early developments.

L'acier Martin dans le monde. La production comparée à celle des autres aciers (69671 B). Émile Demenge. Ills. 10000 w. *Gn Cv*—April 1, 1916. Serial, 1st part. World production of openhearth steel compared with other processes.

Ore Handling

Automatic Skip Handles Hot Ore (73583). H. V. Schiefer. Ills. 1100 w. *E N*—Sept. 28, 1916. Machine to handle hot ore from kiln to storage bin.

Ore-Washing

The Rowe Mine Ore-Washing Plant (68726). Ills. 1000 w. *M & E W*—March 11, 1916. Details of design of new installation.

Oxidation

The Atmospheric Oxidation of Iron Pyrites (73331 N). T. F. Winmill. 2500 w. *I M E, Trans*—Aug., 1916. Results of investigations to determine whether it is the cause of spontaneous ignition of coal.

Pacific Coast

The Pacific Coast Iron Situation (66423 D). 2500 w. *A I M E Bul*—Dec., 1915. Discussion of Charles Colcock Jones' paper.

Pearlite

Notes on Pearlite (73969 N). Henry M. Howe and Arthur G. Levy. Ills. 23 pp. *Ir & St Inst*—Sept., 1916. A study of effects of heating and cooling.

Philippines

Iron Ore on Calamboyanga Island, Mambulao Camarines (65840 N). Wallace E. Pratt. Maps. 2500 w. *Philippine Jour of Sci*—Sept., 1915. History, geology, character, and quantity.

Iron Ore in Surigao Province (65841 N). Wallace E. Pratt and Victor E. Lednicky. Ills. 3500 w. *Philippine Jour of Sci*—Sept., 1915. Character, quantity, and commercial possibilities.

Primitive Iron Smelting in the Philippine Islands (67124 B). J. F. Springer. Ills. 2000 w. *I T R*—Jan. 6, 1916. Descriptive.

Pittsburgh

Pittsburgh Makes Its Greatest Record (67119 B). C. F. Williams. 5000 w.

Prices

I T R—Jan. 6, 1916. Production during 1915.

Prices

Iron and Steel Prices for Eighteen Years (67107 B). Sup. 9 pp. I A—Jan. 6, 1916. Monthly averages covering period 1898-1915.

Production

The Production of Iron Ore, Pig Iron, and Steel in 1914 (66506 N). Ernest F. Burchard. 60 pp. U S G S, I:16—Dec. 9, 1915. Statistics and general review.

Publicity

See same heading under INDUSTRIAL ECONOMY, *Management*.

Pure Iron

Preparation of Pure Iron and Iron-Carbon Alloys (68734 N). J. R. Cain, E. Schramm, and H. E. Cleaves. Ills. 25 pp. U S B S, Sci paper No. 266—Feb. 29, 1916.

The Transformations of Pure Iron (71400 N). Ills. 35 pp. A. E. Oxley and others. Trans Faraday Soc—April, 1916. General discussion.

Quebec

Les Gisements De Fer De La Province De Québec Et Leur Utilisation (73519 B). Émile Dulieux. 4100 y. R T C—Aug., 1916. Iron deposits in the province of Quebec.

Rails

An Investigation of Ladle Test Ingots (66098 A). Ills. 1500 w. I A—Dec. 2, 1915. Advantages of adding aluminum. Report by Robert W. Hunt, for Am. Ry. Engng. Assn.

Commercial Production of Sound Ingots (66710 A). W. D. Bradford. Ills. 1500 w. I A—Dec. 23, 1915. Freedom from pipes by use of special mold.

American Rail Mill Practice (69055 N). 33 pp. A R E A, Bul—Feb., 1916. Algoma Steel Corporation and other companies.

Experimental Researches on the Skin Effect in Steel Rails (72368 B). A. E. Kennelly, F. H. Archard, and A. S. Dana. Ills. 9500 w. F I, JI—Aug., 1916. Research at Mass. Inst. of Tech., with bibliography.

Fissures in Rails Laid to Mill Practice (72474 A). Ills. 1500 w. I A—Aug. 17, 1916. Explains causes of steel rail failures.

Interior Transverse Rail Fissures (72516). P. H. Dudley. Ill. 700 w. R A G—Aug. 18, 1916. Cause and cure of flaws in steel rails.

Turbo Blower and Compressor Regulators (72984). Carl Grossvendt. 2500 w. B F & S P—Sept., 1916. Adapting the turbine-driven unit to various services.

IRON AND STEEL

Review of 1915

Engineering Industries in 1915 (67526 A). 6500 w. Enr—Jan. 7, 1916. Review of iron and steel industries.

The Iron and Steel Trade in 1915 (67843 A). 18600 w. I & C T R—Dec. 31, 1915. District reviews, with editorial.

Iron and Steel (67158). Frederick Hobart. 4000 w. E & M J—Jan. 8, 1916. Review of year. Also Pittsburgh markets, by E. E. V. Luty.

Iron and Steel Works Problems in 1915 (67108 B). J. E. Johnson, Jr. 4500 w. I A—Jan. 6, 1916. Serial, 1st part. Chiefly commercial.

Iron Range Developments in 1915 (67125 B). H. Cole Estep. Ills. 6500 w. I T R—Jan. 6, 1916. Important developments.

Rolling

Beitrage zur Berechnung des Walzdruckes und der Walzarbeit (67060 B). Karl Lang. Ills. 4000 w. St u E—Jan. 6, 1916. Mathematical consideration of points in rolling practice.

Rolling Mills

Newest Type of Merchant Bar Mill (67123 B). Ills. 1000 w. I T R—Jan. 6, 1916. New Duquesne mill.

Electrically Powered Sheet Mill Operation (68852). Charles C. Lynde. Ills. 1500 w. B F & S I—Mar., 1916. Western Reserve Steel Co.

New Bar Mill of Notable Flexibility (70039 A). Ills. 2000 w. I A—May 4, 1916. Details of Cleveland plant.

Electric Drive for Reversing Rolling Mills (71219 D). Wilfrid Sykes and David Hall. Ills. 19 pp. A I E E, Pro—June, 1916. Constructions found desirable.

Difficulties of Rail Manufacture (71079). J. S. Unger. Read before Am. Ir. & St. Inst. Ills. 1700 w. I T R—June 15, 1916. Due to variety of sections, and differences in specifications.

The Working Efficiency of Rolling Steel (72483). Sidney Cornell. 5000 w. M & C E—Aug. 15, 1916. Observations, showing what it costs to make steel.

Electrical Driving of Rolling Mills (73023 A). G. M. Brown. 2500 w. I & C T R—Aug. 18, 1916. Abstract of an article in the *Quarterly Jour.*, England. Advantages, and problems of speed control.

Power Required in Rolling Metals (73017 A). C. E. Davies. 3500 w. Enr—Aug. 18, 1916. Theory governing the consumption of power in the process.

Discussion on "Electric Drive for Reversing Rolling Mill" (Wilfred Sykes and David Hall), Cleveland, Ohio, June

Rolling Mills

Consult Classification of the Index. See page 7.

St. Louis

27, 1916 (74111 D). 18 pp. A I E E. Pro—Oct., 1916.

Operating Data on Electric Blooming Mill (73689). E. S. Jefferies. 2000 w. B F & S P—Oct., 1916. Operating data on electric equipment for rolling mills.

St. Louis

St. Louis—Its Place in the Steel Industry (74016 A). Ills. 2500 w. I A—Oct. 19, 1916. Largest producing district for basic open-hearth steel castings.

Sintering Plants

Sintering Plant Installed at Toledo (70617). H. V. Schiefer. Ills. 3000 w. I T R—May 25, 1916. For unloading, storing, preparing, and sintering flue dust.

Slag-Crushing

See Crushing under *Ore Dressing*.

Slags

Conditions and Causes of Iron in Slags (72221). Wallace G. Imhoff. 2500 w. B F & S P—Aug., 1916. Serial, 1st part. Physical and chemical states of iron in slags; losses and recovery of iron from cinder.

Sound Ingots

Sound Steel Ingots (72778). Ills. 2600 w. T E S—July 28, 1916. Best method of securing sound ingots at minimum cost.

Specifications

One Thousand Steel Specifications Reviewed (71299). R. Fleming. 4500 w. E R—June 24, 1916. Examples of good and bad clauses.

Statistics

Annual Statistical Report (65472 N). 118 pp. Am Iron & Steel Inst—1915. Imports and production, 1914.

Steel

Partial Report of Committee A-1 on Steel (71431 N). 100 pp. A S T M—June, 1916. Reports, proposed revisions.

Appendix IV to Report of Committee A-1 on Steel, Consisting of a Report on Investigations of Ladle-Test Steel Ingots (71448 N). J. R. Cain and H. S. Rawdon. Ills. 17 pp. A S T M—June, 1916.

Topical Discussion on the Relation Between Yield Point and Proportional Limit in Various Grades of Steel (71455 N). 32 pp. A S T M—June, 1916.

American Steel Production Absorbed by Europe (72426). 1300 w. M Rd—Aug. 10, 1916. Problems due to the European war.

An Investigation Dealing With the Occurrence of Alumina Inclusions in Steel (72212). Albert Sauveur. Ills. 1600 w. M & C E—Aug. 1, 1916. To determine whether they could be detected under the microscope, and their characteristics.

IRON AND STEEL

Steel Works

Determination of Chromium and Vanadium in Steel by Electrometric Titration (72337 N). George Leslie Kelley and James Bryant Conant. 4000 w. J I & E C—Aug., 1916. Describes method.

French Specifications for Shell Steel (72856 A). 1500 w. I A—Aug. 31, 1916. Tests and composition required.

Electric and Converter Steel Compared (72900 N). Peter Blackwood. 12 pp. A F A—Sept., 1916. Detailed discussion.

Malleable and Cast Steel (73114 A). Andrew Harley. 5000 w. Mch E—Sept. 1, 1916. Abstract of an address before the British Found. Assn. Discusses a series of tests made.

The Presence of Alumina in Steel (72897 N). George F. Comstock. Ills. 17 pp. A F A—Sept., 1916. How it can be recognized, and the harm when abundant.

Electric Alloy Steels Made on Tonnage Basis (73154 A). Ills. 1200 w. I A—Sept. 14, 1916. Ball-bearing, die, magnet, and high-speed steels made at Latrobe, Pa.

Influence of Some Elements on the Mechanical Properties of Steel (73974 N). Dr. J. E. Stead. 86 pp. Ir & St Inst—Sept., 1916. Reviews the influence of carbon and the heat-treatment of steel.

Steel Industry

The Steel Industry in the War Zone (72228 A). H. H. Campbell. Map. 2500 w. I A—Aug. 3, 1916. Important problems in France and Germany.

Steel Plants

Minnesota Steel Company Completes Plant (66826 A). Ills. & Plate. 4000 w. I A—Dec. 30, 1915. Construction, layout, and operation.

Pacific Coast Steel Company's Plants (72042 A). Ills. 1500 w. I A—July 27, 1916. Open hearth equipment and bar and structural steel rolling mills.

Steel Works

New Iron and Steel Works Construction (67117 B). 10800 w. I A—Jan. 6, 1916. Report of new works completed and in progress.

Youngstown Street and Tube Co. Completes Important Improvements (67128 B). Ills. 1200 w. I T R—Jan. 6, 1916. General description.

L'usine métallurgique allemande Adolf Emil, à Esch-sur-Alzette (Luxembourg) (67002 B). A. Pawlowski. Ills. 5500 w. G C—Dec. 18, 1915. General description of the Emil steel works situated in Luxembourg.

How Steel Is Made in Alabama (70458). H. Cole Estep. Ills. 3500 w. I T R—May 18, 1916. Plant of Gulf States Steel Co.

Consult Classification of the Index. See page 7.

Sulphur

Plant Improvements of Ashland Steel Works (72857 A). Ills. 500 w. I A—Aug. 31, 1916. Economies in material handling.

Sulphur

Das Verhalten des Schwefels im Hoch ofen (68862 B). Bernhard Osann. Ills. 2500 w. St u E—Mar. 2, 1916. Notes on control of sulphur in blast furnaces.

Sulphur Effect

The Effect of Sulphur on Low-Carbon Steel (73741 D). Carle R. Hayward. Ills. 10 pp. A I M E, Bul—Oct., 1916. Results of recent investigation.

Terminology

Trade Terms Used in the Iron and Steel Markets of Great Britain (71647 A). 2000 w. Enr—June 16, 1916. Serial, 1st part. Supplement giving trade terms used in metal and coal markets.

Tin-Plate Plants

Largest Tin Plate Plant in World (67121 B). C. F. Williams. Ills. 2500

MINE OPERATION**Change Houses**

w. I T R—Jan. 6, 1916. Details of plant at McKeesport, Pa.

Titaniferous Ores

The Smelting of Titaniferous Iron Ores (68407 N). Bradley Stoughton, with discussion. 4000 w. C M I, Trans—1915. Early and recent experiments.

United States

Iron and Steel; Steel Works and Rolling Mills of United States (70618). 2500 w. M Rd—May 25, 1916. Census Bureau's summary for 1914.

Washed Metal

Washed Metal (66413 D). Henry D. Hibbard. Ills. 3500 w. A I M E Bul—Dec., 1915. Plant of the Brier Hill Steel Co.; and the process. Also short paper by Edward L. Ford on the removal of metalloids.

Wrought Iron

Notes on the Effect of Blast-Furnace Gases on Wrought Iron (73973 N). Dr. J. E. Stead. Ills. 1500 w. Ir & St Inst—Sept., 1916. Effect at temperatures between 400 and 500 deg. C.

MINE OPERATION**Accidents**

Electrical Accidents in Mines (66629 A). 1200 w. El R—Dec. 3, 1915. Serial, 1st part. Accidents reported to H. M. Inspectors of Mines.

Accounting

See Mine Accounting under INDUSTRIAL MANAGEMENT, *Finance and Costs*.

Air Analysis

A Method for the Rapid Estimation of Oxygen and Blackdamp in the Air of Safety-Lamp Mines (69743 N). Henry Briggs. Ills. 20 pp. I M E, Trans—March, 1916. Device and tests.

Annealing

Note on the Value of Annealing the Connecting Attachments on Winding Plants (73892 N). J. A. Vaughan, with short discussion. Ills. 2000 w. S A I E, JI—Sept., 1916. Report of investigation of accident, and tests showing results of annealed and unannealed material.

Arcitic

Mining the Frozen Gravels of the Arctic (73806 A). Dr. Henry M. Payne. Ills. 2500 w. S JI E—Sept., 1916. Serial, 1st part. Auriferous territory described and methods applied.

Blasting

Modern Blasting Practice (70668). P. B. McDonald. Ills. 2000 w. M & S P—May 27, 1916. Suggestions from a paper by W. S. Simpson.

Blasting Practice at Chuquicamata, Chile (71722). Howard W. Moore. Ills. 600 w. M & S P—July 8, 1916. Churn-drill blasting superseded by tunnel-blasting.

Sensitiveness to Detonation of Trinitrotoluene and Tetranitromethylanilin (71743). Guy B. Taylor and Willard C. Cope. 1500 w. U S B M—Tech paper 145. Tests, results, and comments.

Sensitiveness to Detonation of Trinitrotoluene and Tetranitromethylanilin (72593). Guy B. Taylor and Willard C. Cope. 1500 w. U S B M—Tech paper 145. Experiments and results.

Bolivia

Silver-Tin Mining in Bolivia (73426). Joseph T. Singewald, Jr., and Benjamin Le Roy Miller. Ills. 2500 w. E & M J—Sept. 23, 1916. Modern methods applied in the Oruro district.

Cave-Ins

More Mine Cave-Ins Threaten Parts of Scranton (72424). Ills. 1300 w. E N—Aug. 10, 1916. Serious subsidences.

Change Houses

Miners' Wash and Change Houses (66110 N). Joseph H. White. Ills. 20 pp. U S B M—Tech paper 116. Details of arrangements.

Modern Wash House for Miners (67280). John A. Garcia. Ills. 1800 w. Cl A—Jan. 15, 1916. House meeting requirements.

Compressed Air

Compressed Air

Compressed-Air Equalizing System at Copper Queen (66771). Fred M. Heidelberg. Ills. 1500 w. E & M J—Dec. 25, 1915. Water-pressure storage.

Concentration

Egalisation De La Charge des Machines D'Extraction Électriques (73512 B). P. Normier. Ills. 2300 w. I E—Aug. 25, 1916. Equalization of the load on electric machinery in concentration and separation work.

Cooperation

Coöperative Effort in Mining (70298 D). Joseph P. Hodgson. 1000 w. A I M E, Bul—May, 1916. Results from interchanging ideas.

Costs

What Constitutes the Cheapest Mining (65728). William H. Storms. 2200 w. Min & Engng Wld—Nov. 13, 1915. Open cuts under favorable conditions.

Cripple Creek

The Roosevelt Tunnel and Cripple Creek Mine Operations (73772). W. A. Scott. Ills. 3300 w. M & E W—Oct. 7, 1916. Tunnel work and mining methods.

Dams

Calculation of Mine Dams (69108). Ills. 1200 w. Cl A—March 25, 1916. Method.

Deep Drilling

The Rifling of Diamond-Drill Cores (70294 D). Walter R. Crane. Ills. 3000 w. A I M E, Bul—May, 1916. Investigations and conclusions.

Deep Mines

The Atmospheric Problem in the Deepest Mines (73318). From report by G. Chalmers. 1500 w. C A M—Sept., 1916. Deep mines in Brazil.

Air and Temperature in Deep Mining (72451). 2000 w. M & E W—Aug. 12, 1916. From report of G. Chalmers on the Morro Velho mine.

Drainage

Mine Drainage (69166 N). G. Mathieson. 6000 w. Q G M J—Feb. 15, 1916. Dealing with water under different conditions.

Dredge

Yuba No. 15 All-Steel Gold Dredge (72558). Lewis H. Eddy. 1000 w. E & M J—Aug. 19, 1916. Largest placer dredge. At work in California.

Drilling

Speed and Economy of the Deep Hole Drill Wagon (71025). Charles A. Hirschberg. Ills. 1500 w. C A M—June, 1916. Drilling rig and its work.

Diamond Drilling at Sudbury (72712). L. A. Parsons. 1800 w. E & M J—Aug. 26, 1916. Importance of surveying drill holes at regular intervals.

MINE OPERATION

Explosives

Multiple Drilling Machine (73956 A). Ills. 500 w. Eng—Oct. 6, 1916. Machine built in Providence, R. I., for drilling oil-holes.

The Rifling of Diamond-Drill Cores (73743 D). Ills. 2500 w. A I M E, Bul—Oct., 1916. Discussion of Walter R. Crane's paper.

Electrical Troubles

Some Electrical Troubles and their Remedies (67248 A). Thomas Anderson. Read before the Assn. of Min. Elec. Engrs. Also discussion. 4500 w. I & C T R—Dec. 24, 1915. Cases of electrical faults commonly occurring, and their remedies.

Electric Power

The Development of Electricity in the Scottish Mining Industry (65642 A). A. B. Muirhead. 3000 w. Ir & Coal Trds Rev—Oct. 22, 1915. Presidential address before W of Scotland Branch of Assn. of Min. Elec. Engrs.

Practical Points in Connection with the Use of Electricity in Mines. (65701 A). Ralph R. Smith. Read before the Nat. Assn. of Col. Mgrs. 4000 w. Ir & Coal Trds Rev—Oct. 29, 1915. Instructions.

Application of Electric Power to Mining Work in the Witwatersrand Area, South Africa (67957 D). J. Norman Bulkley. Ills. 4500 w. A I M E, Bul—Feb., 1916. Methods and results.

See Mining under ELECTRICAL ENGINEERING, *Power Applications*.

Electric Shovel

An Electro-Hydraulic Shovel (67945 D). Frank H. Armstrong. Ills. 1000 w. A I M E, Bul—Feb., 1916. Description.

Explosions

Mine Explosions (73068). Frank Haas. 4000 w. Cl A—Sept. 9, 1916. Safeguards against dust explosions.

The Use of Squibs vs. Fuses (73440). 1500 w. Cl A—Sept. 23, 1916. Study of merits by British Government. Preference for former except in gaseous or wet places.

Explosives

Explosives as an Aid to Engineering (66193 A). Charles E. Munroe. 3000 w. A S M E J—Dec., 1915. Reviews history of their use.

Die Erzeugung und Verwendung flüssiger Luft zu Sprengzwecke (66207 B). H. Diederichs. Ills. 3500 w. St u E—Nov. 11, 1915. Methods of production of liquid air and its use as an explosive, developments under war conditions.

Storage and Handling of Explosives in Mines (68222). Charles E. Munroe. Read at 2nd Pan-Am. Cong. 4500 w. E & M J—Feb. 19, 1916. General principles.

Excavators

The Relative Efficiencies of Blasting Gelatine and Gelignite as Used in Hand Drill Stopes in the Gold Mines of the Rand (68449 N). W. S. Simpson. Ills. 8500 w. S A I E, JI—Jan., 1916. Experimental work.

The Sand Test for Determining the Strength of Detonators (70593). C. G. Storm and W. C. Cope. Ills. 60 pp. U S B S—Tech. paper 125. Tests described. Exact means of grading.

The Analysis of Permissible Explosives (70869). C. G. Storm. Ills. 75 pp. U S B M—Bul. 96. Methods used by U. S. Bureau of Mines.

Governing the Use of Explosives in Mines (72724). E. M. Weston. 2500 w. M & E W—Aug. 26, 1916. Conditions affecting the blasting of holes.

High Explosives: Their History and Manufacture, and Their Application to Railway and Kindred Work (73926 N). W. Cleaver. Ills. 18 pp. P W I, JI—Aug., 1916. Advantages of use and methods.

Thawing Explosives (74061). Ills. 1200 w. Cn E—Oct. 19, 1916. From report on mining operations in Quebec. Detailed directions.

Excavators

Lübecker Excavator in the Klondike (71133). C. A. Thomas. Ills. 2000 w. E & M J—June 17, 1916. German type chain-bucket excavator.

Fires

Carbon Dioxide in Extinguishing Mine Fires (69318 A). E. C. Evans. From paper read before Manchester Geol. & Min. Soc. 3000 w. C G—March 17, 1916. Serial, 1st part. Mainly results at Senghenydd Colliery.

Foremen

The Efficient Mine Foreman (68213). I. C. Deloney. Read before Ala. Safety Assn. 2000 w. Cl A—Feb. 19, 1916. Causes of inefficiency.

Gas Detector

Gas Detector for Miners' Electric Safety Lamps (72686 A). T. J. Thomas. 4500 w. C G—Aug. 11, 1916. Report of experiments and results.

Gas Detector for Miners' Electric Safety Lamps (74092 A). T. J. Thomas. 2000 w. C G—Oct. 6, 1916. Experiments with platinum wires and resistance wires in parallel connection and with both wires in series with the filament lamp.

Gases

Accidents from Poisonous Asphyxiating Gases in Mines (69874 A). L. G. Irvine. From an article in *Med. J. of S. Africa*. 5000 w. C G—April 7, 1916. Effects of various gases.

MINE OPERATION**Gasoline Locomotives**

Gasoline Mine Locomotives in Relation to Safety and Health (67594 N). O. P. Hood and R. H. Kudlich. With a Chapter on Methods of Analyzing Exhaust Gases, by George A. Burrell. Ills. 74 pp. U S B M—Bul. 74. Investigation described.

Grouting

A Summary of Experience with Grouting in Sinking Wet Shafts (65501). 1000 w. Engng & Con—Nov. 3, 1915. Lessons taught by examples.

Grouting in a Shaft (66336). J. R. Reigart (Abstract of paper before L. Superior Min. Inst.). Ills. 2000 w. M & S P—Dec. 4, 1915. Conditions, method, results.

Haulage

Compressed Air Haulage in Scotland (65922 A). Diagrams. 600 w. Col Guard—Nov. 12, 1915. Direct rope and main and tail rope with compressed air as motive power.

Continuous Face Haulage (66765). J. F. K. Brown. 2000 w. Cl A—Dec. 25, 1915. A rope haulage system handling about 600 tons per day.

Underground Mine Roads (70791). J. McCrystle. Ills. 4500 w. Cl A—June 3, 1916. Serial, 1st part. Relation to mechanical haulage.

American Coal Mine Haulage (72157 A). Ills. 4500 w. C G—July 14, 1916. Conditions and haulage systems, especially wire rope haulage.

Electric Mine Haulage (73906). C. M. Means. 3000 w. Cl A—Oct. 14, 1916. Considers traction haulage by electric locomotives.

Headlights

Arc and Incandescent Headlights (69939). P. S. Bailey. Ills. 3000 w. Cl A—April 29, 1916. Variety available; special reference to mines.

Hoisting

Förderkorbessschiebvorrichtungen mit elektrischen Antrieb (65448 B). Wintermeyer. Ills. 4000 w. Mont Rund—Oct. 16, 1915. Methods of applying electric drive to loading cars on cages.

The Silver Hill Underground Hoisting Station (65560). James Humes. Ills. 3000 w. Eng & Min Jour—Nov. 6, 1915. Unusually large underground hoist and compressor station; electrically driven.

Mine-Hoist Calculations (66126). F. L. Stone. Ills. 2500 w. Cl A—Dec. 4, 1915. Serial, 1st part. Method for solution.

The New Electric Hoist of the North Butte Mining Co. (67956 D). Franklin Moeller. Also Note on Preliminary Calculation of Flywheel Motor Generator

Hoisting

Hoisting Rope

Sets. C. D. Gilpin. Ills. 3000 w. A I M E, Bul—Feb., 1916. Description.

Automatic Operation of Mine Hoists as Exemplified by the New Electric Hoists for the Inspiration Consolidated Copper Co. (68528 D). H. Kenyon Burch, and M. A. Whiting. Ills. 5000 w. A I M E Bul—March, 1916.

Electric Winding (68917 A). D. Burns. Read Jan. 22, at joint meeting in Glasgow. Also discussion. 4000 w. I & C T R—Feb. 25, 1916. Problem; example.

Discussion on "A Large Electric Hoist" (Sykes), San Francisco, Cal., Sept. 17, 1915 (68761 D). 2500 w. A I E E, Pro—March, 1916.

Types of Modern Electric Winding (69711 A). Frank Anslow. Ills. 5000 w. I & C T R—March 31, 1916. Read before Assn. of Min. Elec. Engrs.

Cross-Compound Winding-Engines for the Chislet Colliery, Near Canterbury (69597 A). Plate. 400 w. Eng—March 31, 1916. Serial, 1st part.

Crown Mines Hoist Installation (70710 A). F. L. Stone. Ills. 1200 w. G E R—June, 1916. Physical characteristics of this Rand mine. Electrical equipments.

Electrical Winding Plant in Scotland (70754 A). Ills. 1300 w. Enr—May 12, 1916. Plant in the Siemens-Ilgner system.

Hoisting Rope

See Wire Rope under **MECHANICAL ENGINEERING, Materials of Construction.**

Hydraulic Stripping

Stripping the Hillcrest Iron Mine with a Sand Pump (67074). Ills. 3500 w. E & M J—Jan. 29, 1916. Hydraulic giant used for stripping capping from ore body and handled by sand pumps.

Illumination

Illumination of Mines (65531 D). Robert P. Burrows. Ills. 2000 w. Am Inst of Min Engrs, Bul—Nov., 1915. Facts relating to illumination problems.

Coal Mine Illumination (67754 N). 9 pp. T S—Jan., 1916. Principles, methods, precautions.

Coal Mine Illumination and Its Relation to Accident Prevention and Miners' Nystagmus (69623 C). R. E. Simpson. 15 pp. I E S Trans—March 20, 1916. Advantages of electric methods; with discussion.

The Hirsch Portable Electric Lamp (69738 N). Hiram H. Hirsch. Ills. 2500 w. I M E, Trans—March, 1916. Description, instructions for care.

Chance Acetylene Safety Lamp (69252). H. M. Chance. Ills. 2500 w. Cl A—April 1, 1916. Improved type; automatic relighting.

Illumination of Mines (70309 A). Ills.

MINE OPERATION

3000 w. A I M E, Bul—May, 1916. Discussion of Burrow's paper.

Law

Extra-Lateral Right (66703). L. F. S. Holland. Ills. 1500 w. M & S P—Dec. 18, 1915. Digest of decisions.

Relation of Governments to Mining (67131). Horace V. Winchell. Read at Int. Engng. Cong. 2000 w. C M JI—Jan. 1, 1916. Serial, 1st part. Broad discussion.

Chinese Mining Legislation (67592 N). William F. Collins. 10500 w. I M M—Jan. 13, 1916. Recent developments affecting mining in China, with constructive criticism of regulations proposed.

Report of Special Washington Meeting Advocating Revision of the United States Mining Laws (67738 N). 106 pp. M M S A, Bul—Dec. 31, 1915. Complete presentation of speeches and discussion.

The Law of Mines (69856). Franklin Wheaton Smith. 5000 w. M & S P—April 22, 1916. Critical discussion, especially of apex law.

Abstracts of Current Decisions on Mines and Mining Reported from Oct. to Dec., 1915 (71112). J. W. Thompson. 72 pp. U S B S—Bul. 118. Law Serial 7.

Proposal for Revision of the United States Mineral Land Laws (71300). 25 pp. M M S A—May 31, 1916. Discussion of proposed bill as framed by the Council of the Society.

Leadville, Colo.

Leadville Pumping and Drainage Projects (73436). W. A. Scott. Ills. 2500 w. M & E W—Sept. 23, 1916. The dewatering of the deeper levels.

Locomotives

Combination Gathering Motor (66129). F. J. Foley. Ills. 1600 w. Cl A—Dec. 4, 1915. Types discarded and machine in successful operation.

Storage-Battery Locomotive in a Coal Mine (69254). F. J. Foley. Ills. 700 w. Cl A—April, 1, 1916. Successful operation.

Manganese Steel

See same heading under **MECHANICAL ENGINEERING, Materials of Construction.**

Mine Cars

Comparative Friction Test of Two Types of Coal Mine Cars (70893 D). P. B. Liebermann. Ills. 2500 w. A I M E, Bul—June, 1916. Testing device in form of a dynamometer car for investigating merits of bearings for mine car use.

Mine Car Design (73320). Marcus L. Hyde. Ills. 3000 w. C M I, Bul—Sept., 1916. Urges standardization. Details.

Consult Classification of the Index. See page 7.

Mine Fires**Mine Fires**

Mine-Fire Methods Employed by the United Verde Copper Co. (73266 D). Robert E. Tally. Ills. 2800 w. A I M E, Bul—Sept., 1916. History of Verde fires; causes; prevention, etc.

Mine Gases

Effects of Atmospheres Deficient in Oxygen on Small Animals and on Men (70872). George A. Burrell and G. G. Oberfell. 1700 w. U S B M—Tech. paper 122. Study of mine atmospheres.

On the Liberation of Gas in Mines (72005 A). N. Yuvenalief. 2200 w. C G—July 7, 1916. Investigations made in Russia.

Effects of Temperature and Pressure on the Explosibility of Methane-Air Mixtures (71791). G. A. Burrell and I. W. Robertson. 9 pp. U S B M—Tech paper 121. Results of experiments.

Mine Air Analysis (71649 A). W. H. McMillan. From lecture at Nottingham. 2500 w. I & C T R—June 16, 1916. Importance of the subject to colliery managers.

Mine Hospitals

The Design of Small Mine Hospitals (73993 N). O. L. Puckett and J. B. deHart. Ills. 2000 w. C M I, Bul—Oct., 1916. Points to be kept in mind.

Mine Locomotives

Rating of Mine Locomotives (72705). R. E. Hellmund and W. A. Clark. 2500 w. Cl A—Aug. 26, 1916. Outline of considerations in connection with rating.

Mine Machinery

Prices of Machinery for Mines (71528). Curves. 1200 w. Cl A—July 1, 1916. Costs of equipment; estimates of installations.

Mine Maps

Care of Mine Maps (72312). George L. Yoste. 1200 w. Cl A—Aug. 5, 1916. Needless abuse of such maps.

Mine Signals

Electric Signalling in Mines (72533 A). R. V. Wheeler and W. M. Thornton. 6500 w. C G—July 28, 1916. Precautions necessary for safety.

New System of Mine Signalling (72259 N). R. H. Gould, with discussion. Ills. 1200 w. S A I E, Trans—April, 1916. Description.

Mine Stable

An Underground Mine Stable (70954). Guy E. Greer. Ills. 1400 w. Cl A—June 10, 1916. Essentials on fireproof construction, good drainage and ventilation.

Mine Supplies

Buying Supplies for a Mine (72960). Nelson Dickerman. 2500 w. M & S P—Sept. 2, 1916. Experiences in Colombia.

MINE OPERATION**Mount Lyell****Mine Telephones**

The Telephone in Mine Accidents (72159 A). 1500 w. C G—July 14, 1916. Instruments and their use.

Mine Water

The Chemistry of Mine Water (74179). C. M. Young. Ills. 4000 W. Cl A—Oct. 28, 1916. Chemical reactions taking place in water during its percolation through the earth.

Mining Methods

Stoping Methods (68282). F. W. Sperr. Ills. 3000 w. M & S P—Feb. 19, 1916. Questions and answers bringing out essential points.

Mitchell Top-Slice and Caving System (69113). Robert H. Dickson. Ills. 4000 w. E & M J—March 25, 1916. Variations of system.

Modern Methods of Mining and Ventilating Thick Pitching Beds (71755 D). H. M. Crankshaw. Ills. 10 pp. A I M E, Bul—July, 1916. Principles and description of present method.

Mining Ore from Pillars (72095). H. H. Hodgkinson. Ills. 2200 w. E & M J—July 29, 1916. Methods giving improved recovery.

Dip and Strike Calculations from Drill-Hole Data (71819). George E. Burton. Ills. 1000 w. E & M J—July 15, 1916. Mathematical.

Imagination Applied to Mining (71990). J. F. K. Brown. 3000 w. Cl A—July 22, 1916. Glances into the future.

An Economical System of Mining (73439). R. J. Sampson. Ills. 1500 w. Cl A—Sept. 23, 1916. Modified room-and-pillar system.

Cost and Extraction in the Selection of a Mining Method (73262 D). C. E. Arnold. 900 w. A I M E, Bul—Sept., 1916. Calculations and conclusions.

Ore-Drawing Tests and the Resulting Mining Method of Inspiration Consolidated Copper Co. (73260 D). George R. Lehman. Ills. 14 pp. A I M E, Bul—Sept., 1916. Experiments and the caving system of mining.

The Block Method of Top Slicing of the Miami Copper Co. (73261 D). E. G. Deane. Ills. 1100 w. A I M E, Bul—Sept., 1916. Details of method.

The Relation of the Size of the Car and Gauge of the Track to the Economic Working of a Coal Seam (73994 N). James Holden. 1500 w. C M I, Bul—Oct., 1916. Things to be considered before choosing the type of car.

Mount Lyell

Mining Methods at Mount Lyell (72967). R. M. Murray. Read before Aust. Inst. of Min. Engrs. Ills. 3000 w. E & M J—Sept. 2, 1916. Unusual methods.

Consult Classification of the Index. See page 7.

Nevada

MINE OPERATION

Quarrying

Nevada

Mines and Mining Operations at Ely, Nevada (72947). A. G. Hillen. Ills. 2000 w. M & E W—Sept. 2, 1916. Progress of development.

Nitration

The Nitration of Toluene (74242). E. J. Hoffman, with bibliography. 26 pp. U S B M—Tech paper 146. Reports experiments and results, with conclusions.

Nomenclature

Nomenclature of Mining Methods (71975). George J. Young. 4000 w. E & M J—July 22, 1916. Classification of names employed, and desirability of uniformity.

Openpit Mining

Stripping the Overburden in Openpit Mining Operations (68334 A). L. O. Kellogg. Ills. 4500 w. E M—March, 1916. Recently developed methods.

Ore Hopper

Patterns for a Hopper (73125). George A. Jones. 1500 w. B M—Sept., 1916. Layout of patterns for an ore hopper, with explanation.

Ore Loading

Progress in Underground Ore Loading (71986). M. E. Richards. Ills. 2000 w. C M J—July 15, 1916. From a paper read before L. Superior Min. Inst. Types of loading machines.

Pipe-Lines

The Nevada Wonder Pipe-Line (69147). J. A. Burgess. Ills. 3000 w. M & S P—March 25, 1916. Automatic protective devices.

Power Plants

The Rotary in Mine Work (65320). C. M. Means. 1200 w. Coal Age—Oct. 30, 1915. Advantages over the motor-generator set.

Canonsburg Gas Coal Co.'s Plant (66127). C. M. Means. Ills. 700 w. Cl A—Dec. 4, 1915. Alternating and direct current.

Mixed Pressure Turbine Plant at a Modern German Colliery (68452 A). Ills. 2500 w. C G—Feb. 11, 1916. Details of the plant at the Neu-Iserlohn I mine of the Harpener Bergbau Akt.-Ges.

Lucerne Mines Power Plant (71692). Warren O. Rogers. Ills. 1800 w. Pwr—July 11, 1916. Steam turbine plant supplying power to a group of mines. Bone fuel is burned in the boiler furnaces.

Diesel Engines versus Steam Turbines for Mine Power Plants (71756 D). Herbert Haas. Ills. 12 p. A I M E, Bul—July, 1916. Conditions favoring the use of Diesel engines. Economic considerations.

Description of the Kleinfontein Power Association's Plant (72258 N). Gerard

Graham, with discussion. 12 pp. S A I E, Trans—March, 1916. Plant supplying power to five mines.

Power Plant of the Burro Mountain Copper Co. (73264 D). Charles Legrand. Ills. 1800 w. A I M E, Bul—Sept., 1916. The largest stationary Diesel engine in the United States.

Prospecting

Prospecting on the Chiksan Concession (66496). Charles W. DeWitt. Ills. 1200 w. M & S P—Dec. 11, 1915. Methods used in Korea.

Portable Mining Equipment for Prospects (70962). Louis A. Rehfuess and W. Clifford Rehfuess. Ills. 2000 w. E & M J—June 10, 1916. Gasoline units.

Outcrops and the Prospector (72020). William H. Storms. Ills. 3000 w. M & S P—July 22, 1916. Useful knowledge for a prospector.

Pumping

Pumping at the Commonwealth Mine, Arizona (65939). Edgar A. Collins. Diagrams. 1500 w. Min & Sci Pr—Nov. 20, 1915. Details of a large pumping problem in the solution of which a steel bulkhead door was set in the cross-cut.

Pumping Installations in the Leadville District (67517). Albert E. Guy. Ills. 1200 w. M & E W—Jan. 22, 1916. Recent installations.

The Unwatering of the Down Town Mining District of Leadville (67632 A). W. H. Horton, Jr. Ills. 3000 w. G E R—Feb., 1916. Details.

The Water Problem at the Old Dominion Mine (69480 D). P. G. Beckett. Ills. 10000 w. A I M E, Bul—April, 1916. Sources of water, heavy pumping during flood, recovery of levels lost by inrush.

Pumping Plant at Glencraig Colliery (71844 A). Ills. 1000 w. I & C T R—June 30, 1916. Comprises sets of the old shaft and the latest type of double-acting ram pumps.

Handling Water in Underground Workings (72957). H. S. Geismer. Ills. 3500 w. Cl A—Sept. 2, 1916. Mine pumps.

Quarries

Quarries for Kensico Dam (72419). Wilson Fitch Smith. Ills. 1800 w. E N—Aug. 10, 1916. Operation of quarries supplying 900,000 cu. yds. of stone.

Quarrying

Quarrying at Rockland Lake (70861). H. L. Hicks. Ills. 1500 w. E & C—June 7, 1916. Improved methods of trap rock quarries at Congers, N. Y.

Compressed Air at Rockland Lake Quarry (72032). H. L. Hicks. Ills. 1500 w. C A M—July, 1916. Uses to which the air is applied.

Consult Classification of the Index. See page 7.

Rock Drilling

The Technology of Marble Quarrying (71744 A). Oliver Bowles. Ills. 165 pp. U S B M—Bul 106, Min Tech 13. Statement of most efficient and economical methods now in use.

The Care and Operation of Quarrying and Crushing Equipment (72517 A). R. M. Smith. From paper before Ontario Conference on Road Construction. 1800 w. Qry—Aug., 1916. Attention needed by this kind of machinery.

Granite Quarrying in North Wales (73950 A). Ills. 3500 w. Qry—Oct., 1916. Serial, 1st part. The quarries, production, methods, machinery, etc.

See also same heading, under **ELECTRICAL ENGINEERING, Power Applications.**

Rock Drilling

How to Choose Rock Drills (65329). J. R. McFarland. 6000 w. Eng & Min Jour—Oct. 30, 1915. How tests should be made.

Hammer-Drilling in Colorado (65393). E. G. Snedaker. Ills. 2500 w. Min & Sci Pr—Oct. 30, 1915. Novel applications.

Drilling in Narrow Stopes (66970). P. B. McDonald. Ills. 2500 w. M & S. P—Jan. 1, 1916. Methods, and care of drills.

Rock Excavation

Rock Excavation in Coal Mines (71530). C. Jackson. Ills. 1700 w. Cl A—July 1, 1916. Forms of rock work, and types of electrically-operated drills.

Roofs

The Roofing of Mine Buildings (72313). J. W. Latimer. 1800 w. Cl A—Aug. 5, 1916. Suggestions. The asbestos shingle.

Safety Lamps

Approved Safety Lamps (72158 A). Ills. 2500 w. C G—July 14, 1916. Serial, 1st part. Newer types approved in England.

The Illuminating Power of Safety Lamps (72253 D). W. M. Weigel. Ills. 10 pp. A I M E, Bul—Aug., 1916. Comparison of candlepower of several kinds of safety lamps.

Samples

Samples and Their Interpretation (70666). E. H. Dickenson and H. J. Volker. Ills. 3000 w. E & M J—May 27, 1916. Methods outlined for plotting assay maps and showing value of ore, width and tonnage.

Sampling

Sampling Low-Grade Ore on a Large Scale (65790). Downie D. Muir, Jr. Ills. 3500 w. Min & Sci Pr—Nov. 13, 1915. Methods used in Alaska.

Taylor's Pulp Sampler (67593 N). W. H. Trewartha-James. Ills. 1800 w. I

MINE OPERATION**Shafts**

M M—Jan. 13, 1916. Details of new machine.

Santa Gertrudis

Mining and Milling Practice at Santa Gertrudis (72251 D). Hugh Rose. Ills. 37 pp. A I M E, Bul—Aug., 1916. Properties in the Pachuca district, Mexico. Methods.

Sapphires

Sapphire-Mining Industry of Anakie, Queensland (73761 N). 3000 w. I I, Bul—April-June, 1916. Geological features, origin, deposits, method of working, etc.

Scraper Mining

Scraper Mining for Low Veins (71122). Ills. 1000 w. Cl A—June 17, 1916. Economical method for thin, flat seams.

Shaft Pillars

Forming a Shaft-Pillar in Thin Seams (68172 N). James Black. 2500 w. I M E, Trans—Jan., 1916. Methods and cost.

Shafts

Collapse and Recovery of Central Incline Shaft, Bantjes Consolidated Mines Limited (65930 A). Percy Cazalet and W. W. Lawrie. From *Jour. S. African Inst. of Engrs.* Ills. 2000 w. Col Guard—Nov. 5, 1915. Details of the work.

Lining Shafts with Concrete Z Blocks (66489 N). Marcel Gilleaux. Plates & Ills. 3000 w. I M E—Nov., 1915. Describes process.

Concrete Shaft Lining; Development of Form Handling and Concrete Placing Methods (67982). Ills. 7000 w. E & C—Feb. 9, 1916. Competition.

Concreting the Barron Shaft in Pachuca, Mexico (69568). J. E. Smith. Ills. 1500 w. E & M J—April 15, 1916. Relining work under difficulties caused by revolution.

Driving of a 1,200-Ft. Raise (73074). S. Ford Eaton. Ills. 4500 w. E & M J—Sept. 9, 1916. Problems encountered and their solution.

Shaft Sinking Through Soft Material (73263 D). Edward A. Sayre. Ills. 2200 w. A I M E, Bul—Sept., 1916. Results in two shafts. Favors the drop-shaft method.

Concreting the Sacramento Shaft at Bisbee (73796). Ills. 5000 w. M & S P—Oct. 7, 1916. Details of difficult work without interfering with hauling ore.

Re-Timbering a Four-Compartment Shaft (73934). H. G. Thiele. Ills. 1400 w. M & S P—Oct. 14, 1916. Difficult problem of shaft repair.

Widening of the Upcast Shafts at Tinsley Park Colliery (74091 A). H. J. Atkinson. Ills. 2500 w. C G—Oct. 6, 1916. Details of the work.

Consult Classification of the Index. See page 7.

Shaft Sinking

MINE OPERATION

Tramming

Shaft Sinking

Handling Compressed Air in Shaft Sinking (70790). F. D. Buffum. Ills. 2500 w. C I A—June 3, 1916. Use of a booster compressor and other details.

Opening Shaft Mines (70663). M. L. Hyde. Ills. 3000 w. C I A—May 27, 1916. Plans and suggestions.

The Sinking and Equipment of a Circular Shaft (71071 N). James Nisbet. Ills. 34 pp. I M E, Trans—May, 1916.

Procedures That Reduced Costs in Sinking Four Inclined Mine Shafts (73345). Albert E. Hull. Ills. 2500 w. E & C—Sept. 20, 1916. Variations in methods imposed by different conditions.

Shops

Drill- and Tool-Sharpening Shop at the Copper Queen Mine (71277). Ills. 3000 w. E & M J—June 24, 1916. Designed as a result of efficiency work.

Shoveling Machines

Progress in Underground Ore Loading (66660 N). M. E. Richards. Ills. 2200 w. L S M I—Vol. XX. Mechanical shovels and machines tried.

Signaling

A New Battery Signalling Bell (66488 N). W. M. Thornton. Also discussion. 13 pp. I M E—Nov., 1915. Principals and details.

Stope Surveying

Stope Surveying at Mount Lyell (71818). G. F. Jakins and L. J. Coulter, in *Pro. Aust. Inst. of Min. Engrs.* 4000 w. E & M J—July 15, 1916. Novel scheme made necessary by character of ore deposit.

Stoping

Notes on Shrinkage Stopping (66004). E. H. Dickenson and H. J. Volkes. Ills. 2000 w. Eng & Min Jour—Nov. 27, 1915. Details of methods.

Broken Hill Underground Mining Methods (67432 D). E. J. Horwood. Ills. 6000 w. A I M E, Bul—Jan., 1916. Methods varied in accordance with character of ore.

Underground Mining Methods of Utah Copper Co. (67431 D). Thomas S. Carnahan. Ills. 2500 w. A I M E, Bul—Jan., 1916. Shrinkage stoping as auxiliary and preliminary to steam-shovel operations.

The Gillman Cut-and-Fill System of Mining (69381). Robert H. Dickson. Ills. 2000 w. E & M J—April 8, 1916. New system at C. & A., Bisbee.

Stoping by Branched Raises (70549). F. W. Sperr. Ills. 1800 w. M & S P—May 20, 1916. Analysis of supposititious conditions.

Stoping Methods of Miami Copper Co. (70891 D). David B. Scott. Ills. 4000 w. A I M E, Bul—June, 1916. System believed to be typical of best features.

Stoping in the Calumet and Arizona Mines, Bisbee, Ariz (71752 D). Philip D. Wilson. Ills. 18 pp. A I M E, Bul—July, 1916. Conditions determining methods.

Storage-Battery Locomotives

Novel Combination Locomotive (66128). E. C. De Wolfe. Ills. 2000 w. C I A—Dec. 4, 1915. Details.

Stripping

Hydraulic Stripping at Rowe and Hillcrest Mines on the Cuyuna Range, Minnesota (66656 N). Edward P. McCarty. Ills. 2500 w. L S M I—Vol. XX. General features.

Drag-Line Stripping and Mining, Balkan Mine, Alpha, Mich., Menominee Range, Mastodon District (66657 N). Charles E. Lawrence. Ills. 1200 w. L S M I—Vol. XX. Machines and methods.

Surveying

A New Method of Putting in Survey Stations (65861). H. C. Austin. Ills. 1500 w. Coal Age—Nov. 20, 1915. Sight stations less liable to damage if placed in the roof.

Talc

Method of Mining Talc (72255 D). F. R. Hewitt. 500 w. A I M E, Bul—Aug., 1916. Methods in western North Carolina; manufacture and uses.

Telephones

Mine Telephone Equipment (66594). Walter C. Freeman. Ills. 2500 w. C I A—Dec. 18, 1915. Discussion of various systems.

Timber

Pit Timber and Its Preservation (69590 A). Percy Groom. Read before Midland Inst. of Min., Civ. & Mech. Engrs. 3000 w. C G—March 24, 1916. Causes of decay, protection.

Pit-Timber and Its Preservation (71067 N). Percy Groom, with discussion. 5000 w. I M E, Trans—May, 1916. Résumé of present knowledge of decay of wood and economic methods of checking.

Timbering

Calculation of Mine Gangway Timbers (65862). A. G. Morlock. 1400 w. Coal Age—Nov. 20, 1915. Determining sizes of different kinds of timber or steel.

Tramming

The Logic of Trams (68627 A). John Gibson. 4500 w. From paper before N. of Eng. Inst. of Min. & Mech. Engrs. C G—Feb. 18, 1916. Importance of standardization.

Utah

The Logic of Trams (69739 N). John Gibson. Plate. 7000 w. I M E, Trans—March, 1916. Size, construction, and track.

Discussion of Mr. John Gibson's Paper on "The Logic of Trams" (71073 N). 18 pp. I M E, Trans—May, 1916.

Utah

The Lakeview Mine, Utah (73635). Douglas W. Jessup. Ills. 4500 w. E & M J—Sept. 30, 1916. Large zinc producer.

Ventilation

Ueber die Temperatur der Erdrinde und ihre Beziehungen zum Luftdruck und zur Luftdichte (65449 B). Chr. Mezger. 5000 w. Glck—Oct. 16, 1915. Investigations into underground temperatures and their bearing on the dynamics of air movement.

Notes on Mine Ventilation (66512). John Shanks. Ills. 2500 w. C M I—Dec., 1915. Principles.

Effect of Barometric Pressure to Derange or Stop Ventilation (67499). F. C. Cornet. 1800 w. Cl A—Jan. 22, 1916. Fall causes outflow of gas.

Important Features in Mine-Ventilating Fans (67283). H. H. Valiquet. 1800 w. Cl A—Jan. 15, 1916. Advises fans best suited to lending themselves to changing requirements.

Mine Ventilation Stoppings, with Especial Reference to Coal Mines in Illinois

MINES AND DISTRICTS

America

(67540 N). R. Y. Williams. Ills. 20 pp. U S B S—Bul. 99. First cost of several types, and expense of maintaining.

The Value of the Experimental Fan in the Mining Laboratory (67666 A). David E. Thomas. 2500 w. C G—Jan. 14, 1916. Need of study.

The Value of the Experimental Fan in the Mining Laboratory (69047 N). David E. Thomas. Ills. Discussion. 5000 w. I M E, Trans—Feb., 1916. Work that can be usefully carried out in mining laboratory.

Auxiliary Ventilation (69712 A). 4000 w. I & C T R—March 31, 1916. Discussion by Nat. Assn. of Col. Engrs. Introduced by short paper by J. Ensor.

Ventilation Without Crosscuts (69253). W. J. Montgomery. Ills. 700 w. Cl A—April 1, 1916. Methods.

Warehouses

Mine Warehouse System (67281). E. I. Roberts. Plan. 2500 w. Cl A—Jan. 15, 1916. Serial, 1st part. Suggestions for the handling of supplies.

Wire-Rope Guides

The Use of Wire-Rope Guides for Pit Cages (69332 A). William Ross. Ills. 3800 w. I & C T R—March 17, 1916. Details.

MINES AND DISTRICTS

Alaska

Mining in Alaska in 1915 (67212). Alfred H. Brooks. Maps. 4500 w. M & S P—Jan. 8, 1916. Advance statement of U. S. Geol. Survey.

The Chisana-White River District, Alaska (72078 A). Stephen R. Capps. Ills. & Maps. 120 pp. U S G S—Bul. 630. Investigation of the gold placers, copper prospects, copper and gold lodes, etc.

The Ketchikan District, Alaska (72153). Emil Edward Hurja. Ills. 2000 w. M & S P—July 29, 1916. Information concerning copper mining.

Consolidation of the Treadwell Mines (72742). Plan and Ills. 5000 w. M & S P—Aug. 26, 1916. Abstracts from a report by a committee of engineers, study of the problems, recommending consolidation of these important gold-mining properties.

Mining Developments and Water-Power Investigations in Southeastern Alaska (72826 N). Theodore Chapin and George H. Canfield. Maps. 55 pp. U S

G S—Bul. 642-B. Advance in copper and gold lode mining during 1915.

Preliminary Report on the Trolovana District, Alaska (72395 N). Alfred H. Brooks. Map. 9 pp. U S G S—Bul. 642-G. Information concerning this region where placers were recently discovered.

The Cosna-Nowitna and Ruby-Kumkokwim Regions, Alaska (72733 N). Papers by H. M. Eakin, J. B. Mertie, Jr., and G. L. Harrington. Maps. 55 pp. U S G S—Bul. 642-H. Report of this region.

Mineral Resources of Alaska (73163 N). Alfred H. Brooks, and Others. Maps. 260 pp. U S G S—Bul. 642. Report on progress of investigations in 1915.

America

Gold and Silver Deposits in North and South America (69483 D). Waldemar Lindgren. Maps. 10000 w. A I M E, Bul—April, 1916. Compilation and conclusions.

See also *Geology*.

Consult Classification of the Index. See page 7.

Appalachian Region

MINES AND DISTRICTS

Broad Pass

Appalachian Region

Gold Mining in the Southern Appalachian Region (70050). Joseph Hyde Pratt. 2500 w. M Rd—May 4, 1916. Deposits; production, and value.

Argonaut

The Argonaut Mine, Calif. (72315). Lewis H. Eddy. Ills. 2500 w. E & M J—Aug. 5, 1916. Old mine with reconstructed plant and further underground development.

Arizona

Mining in Arizona (65791). Charles F. Willis. Map. 1600 w. Min & Sci Pr—Nov. 13, 1915. Conditions during the past month.

Gold, Silver, Copper, Lead, and Zinc in Arizona in 1914 (66552 N). V. C. Heikes. 50 pp. U S G S, I:15—Dec. 14, 1915. Statistics.

Arizona (67890 A). F. R. Dyas. Ills. 5000 w. M & E W—Feb. 5, 1916. General review of 1915.

Present Development of the Oatman District of Arizona (70787). W. A. Scott. Ills. 3000 w. M & E W—June 3, 1916. Conditions at this gold camp.

Mining in Arizona (72152). Charles F. Willis. Ill. 2000 w. M & S P—July 29, 1916. Increased production and progress.

Australasia

Mining in Australasia in 1915 (67170). W. P. Geary. 2000 w. E & M J—Jan. 8, 1916. Production of gold, silver, lead, zinc, and tin.

Australia

The Mount Morgan Mine and Works (72747 N). Ills. 3000 w. M & E R—July, 1916. Serial. 1st part. This famous gold mine now a low grade copper proposition.

Austria-Hungary

Die Metallversorgung der österreichisch-ungarischen Monarchie (67001 B). L. St. Ranier. 4800 w. M R—Dec. 1, 1915. Position of Austria-Hungary in production, use and supplies of the metals.

Beaver Lake

The Beaver Lake District, Saskatchewan and Manitoba (65551). William McInnes. Extracts from Mem. No. 30. Maps. 4000 w. Can Min Jour—Nov. 1, 1915. Report of survey of "The Basins of Nelson and Churchill Rivers."

Bolivia

Bolivian Mining in 1915 (67506). P. F. Blik and M. G. F. Sohnlein. Map. 3000 w. E & M J—Jan. 22, 1916. Tin, copper, and other ores.

Boulder County

Boulder County Tungsten District as it is To-day (70509). J. Gillingham Hibbs.

1500 w. M & E W—May 20, 1916. Serial, 1st part. Present conditions in this Colorado district.

Brazil

The Mineral Wealth of Brazil (65669 A). 2500 w. Engng—Oct. 29, 1915. Ore deposits and their development.

Mining Industry of Brazil (69969). Benjamin Leroy Miller and Joseph T. Singewald, Jr. 3000 w. E & M J—April 29, 1916. Extensive and varied resources; mining undeveloped.

The Gold Mines of Brazil (72093). Benjamin LeRoy Miller and Joseph T. Singewald, Jr. Ills. 5000 w. E & M J—July 29, 1916. Important mines and methods.

British Columbia

Preliminary Review and Estimate of Mineral Production, 1915 (68291 N). William Fleet Robertson. 45 pp. B C Bureau of Mines—Bul. No. 1, 1916. Approximate statement of conditions of mining.

Mining in British Columbia in 1915 (67914). E. Jacobs. 2500 w. C M JI—Feb. 1, 1916. Production.

The Slocan District, British Columbia, in 1915 (68225). E. Jacobs. 2500 w. C M JI—Feb. 15, 1916. Serial, 1st part. Reports from the mines.

Notes on the Geology of the "Molly" Molybdenite Mine, Lost Creek, Nelson Mining Division, B. C. (68413 N). Charles W. Drysdale. 2500 w. C M I, Trans—1915. Production geology of ore deposit, etc.

Ainsworth Mining Camp (68410 N). Stuart J. Schofield. Ills. 2500 w. C M I, Trans—1915. Descriptive.

Notes on the Geology and Exploration of Copper Mountain in the Similkameen District of British Columbia (68409 N). Frederic Keffer. Maps and Ills. 2000 w. C M I, Trans—1915. Mineralization and general information.

Metallurgical Improvement in British Columbia (70556). E. Jacobs. 1600 w. C M JI—May 15, 1916.

British Guiana

Mining in British Guiana (69826). 1500 w. E & M J—April 22, 1916. Official details.

Broad Pass

The Broad Pass Region, Alaska (65797 N). Fred H. Moffit. Ills. & Maps. 70 pp. U S Geol Surv—Bul. 608. Geologic and topographic features of this pass through which a railway route is planned.

Consult Classification of the Index. See page 7.

Burma

Burma

The Bawdwin Mines (68888 A). J. D. Hoffmann. Ills. 8 pp. M Mg—Mar., 1916. General description.

California

Gold, Silver, Copper, Lead, and Zinc in California and Oregon in 1914 (65757 N). Charles G. Yale. 60 pp. U S Geol Surv, I: 13—Oct. 30, 1915. Production. California (67891 A). A. H. Martin. Ills. 5000 w. M & E W—Feb. 5, 1916. Review of operations 1915.

Canada

The Production of Copper, Gold, Lead, Nickel, Silver, Zinc, and Other Metals in Canada During the Calendar Year 1914 (66847 N). 75 pp. C D M—No. 350. Advance chapter, of annual report of Canadian Department of Mines.

Canada (67902 A). Ills. 4000 w. M & E W—Feb. 5, 1916. I. The Cobalt District, Ontario. Kirby Thomas. II. Ontario Mines and Mills. Royce P. Eckstorm. III. British Columbia. Royce P. Eckstorm. Reviews of 1915.

Summary Report of the Mines Branch of the Department of Mines for the Calendar year ending Dec. 31, 1914 (68272 A). Ills. 223 pp. C D M—No. 346.

The Production of Cement, Lime, Clay Products, Stone, and other Structural Materials in Canada during the Calendar year 1914 (68273 N). John McLeish. 60 pp. C D M—No. 383.

Preliminary Report on the Mineral Production of Canada During the Calendar Year 1915 (68651 N). John McLeish. 23 pp. C D M—No. 408.

Mining Enterprises in Canada (70950). J. B. Tyrrell. 1500 w. C M JI—June 1, 1916. From report of Anglo-French Exploration Co.

Central America

Central America in 1915 (67166). 600 w. E & M J—Jan. 8, 1916. Review of operations.

Chile

The Mineral Industry of Chile (69240). Lester W. Strauss. Map. 2500 w. M & S P—April 1, 1916. Nitrate industry, copper and iron, and other lines of activity.

Exploitation of Chilean Mines (72456). Benjamin L. Miller and Joseph T. Singewald, Jr. Ills. 3800 w. E & M J—Aug. 12, 1916. Possibilities discussed; development of copper, iron, and nitrate deposits.

China

Mining in Hunan, China (66777 A). A. S. Wheeler, in *Far Eastern Review*. 2500 w. M JI—Dec. 11, 1915. Kinds of ores worked.

MINES AND DISTRICTS

Ellamar

Metalliferous Mines of Hunan (68636). A. S. Wheeler. Abstract from *Far East Rev.* Ills. 4000 w. M & S P—March 4, 1916. Metals and methods.

Discussion on "Chinese Mining Legislation" (68686 N). William F. Collins, and others. 19 pp. I M M, Bul 137—Feb. 17, 1916. Legal conditions; difficulties.

The Minerals of Sze-Chuan, China (72141 B). Herbert W. L. Way. Map. 2500 w. M Mg—July, 1916. Investigation of the mineral resources, which include gold, silver, copper, salt, petroleum, etc.

Chuquicamata

Mine of Chile Exploration Co., Chuquicamata, Chile (68051). Pope Yeatman. Ills. 7500 w. E & M J—Feb. 12, 1916. General description.

Colorado

Colorado (67894 A). Ills. 2500 w. M & E W—Feb. 5, 1916. Review of 1915. Mining in Colorado in 1915 (67508).

2000 w. E & M J—Jan. 22, 1916. Summary.

Columbia

Mining Possibilities in Colombia, South America (70508). Matt W. Alderson. Ills. 2500 w. M & E W—May 20, 1916. Serial, 1st part. Running account.

Cuba

Mining in Oriente Province, Cuba (69235). Joseph T. Singewald, Jr., and Benjamin Le Roy Miller. Ills. and Map. 5500 w. E & M J—April 1, 1916. Running description.

Underground Mining in Cuba (73250). L. B. Reifsnider. Ills. 2500 w. E & M J—Sept. 16, 1916. Development of a body of iron ore.

Dutch Guiana

Gold Deposits of Dutch Guiana (66163). J. B. Percival. 2000 w. C M JI—Dec. 1, 1915. Opportunities; general information.

Mining in Surinam (Dutch Guiana) (69655 N). Samuel McKirahan. 4 pp. P Q—April, 1916. Brief notes.

Eastern States

Gold, Silver, Copper, Lead, and Zinc in the Eastern States in 1915 (71029 N). James M. Hill. 16 pp. U S G S, I: 2—June 7, 1916. Statistics.

Ecuador

Mining in Ecuador (67809). J. W. Mercer. Map. 4500 w. M & S P—Jan. 29, 1916. General; especially Zaruma mine.

Ellamar

The Ellamar District, Alaska (65796 N). S. R. Capps and B. L. Johnson. Maps & Ills. 115 pp. U S Geol Surv—Bul 605. Detailed study of the geology and ores.

Gilpin County

MINES AND DISTRICTS

Nevada

Gilpin County

Preliminary Report on the Economic Geology of Gilpin County, Colorado (68476 N). Edson S. Bastin and James M. Hill. Ills. 28 pp. U S G S, Bul 620-M—Jan. 21, 1916. Results of study.

Grass Valley

Notes from Grass Valley (68637). P. B. McDonald. Ills. 2000 w. M & S P—March 4, 1916. Improvements.

Homestake

A History of the Homestake Mine, S. D. (71833). Richard Blackstone. Ills. 2000 w. M & E W—July 15, 1916.

Hungary

Bergbau und Hüttenwesen Ungarns im Jahre 1913 (65425 B). D. A. Zsigmondy. Ills. 3000 w. Glck—Oct. 9, 1915. General review of Hungary's mining and metallurgy in 1913.

Idaho

Gold, Silver, Copper, Lead and Zinc in Idaho and Washington in 1914 (66642 N). C. N. Gerry. 60 pp. U S G S, I:18—Dec. 17, 1915. Statistics.

Mining in Idaho (67507). Robert N. Bell. 3500 w. E & M J—Jan. 22, 1916. Exploration and increased production.

Idaho (67893 A). H. W. Ingalls. Ills. 4000 w. M & E W—Feb. 5, 1916. Review of 1915.

Lode Mining in the Quartzburg and Grimes Pass Porphyry Belt, Boise Basin, Idaho (72076 N). E. L. Jones, Jr. 28 pp. U S G S, 640-E—July 25, 1916. Account of the geology and ore deposits.

Japan

Mining in Japan in 1915 (67288). H. W. Paul. 1500 w. E & M J—Jan. 15, 1916. Production of coal, copper, gold and silver and other minerals.

Coal and Other Minerals in Japan (73212 A). Watson Smith. 3000 w. R S A, JI—Sept. 1, 1916. Minerals found, methods of mining, etc.

Joplin

Studies of Joplin Ore Deposits (70102 B). H. Foster Bain. Ills. 7 pp. M Mg—Apr., 1916. Critical discussion.

Lake Superior

Lake Superior (67901 A). 2500 w. M & E W—Feb. 5, 1916. Copper and iron during 1915.

Madagascar

L'Industrie minière a Madagascar (66220 B). G. Grandidier. 7 pp. R G S—Nov. 15, 1915. Serial, 1st part. Iron, gold and other minerals in the island of Madagascar.

Notes on Rare Minerals in Madagascar (70469 N). T. P. Waites. 1500 w. C M M S S A, JI—March, 1916. Uranium, niobium and tantalum.

Malaya

Mineralization in Malaya (65429 A). William R. Jones. Ills. 4000 w. Min Mag—Oct., 1915. Serial, 1st part. Particularly tin lodes.

Mining in Trengganu (65996 A). Henry Brelich. Ills. 4 pp. Min Mag—Nov., 1915. Tin, tungsten and other minerals on the east coast of the peninsula.

Manitoba

The Gold Lake District, Manitoba, Canada (68220). George A. Packard. Map: 1200 w. E & M J—Feb. 19, 1916. New discoveries.

Field for the Prospector in Manitoba, Canada (70684). W. K. Harding. Maps. 2500 w. M & E W—May 27, 1916.

The Mineral Belt North of The Pas, Manitoba (73036). Map & Ills. J. S. De Lury and others. 2500 w. C M JI—Sept. 1, 1916. The region and known deposits.

Mineral Deposits

The Mineral Belt North of the Pas, Northwestern Manitoba and Eastern Saskatchewan (73991 N). R. C. Wallace and J. S. De Lury. 2500 w. C M I, Bul—Oct., 1916. Investigation of mineral deposits from Flin-Flon Lake eastward.

Missouri

Missouri (67899 A). Otto Ruhl. Ills. 1500 w. M & E W—Feb. 5, 1916. Production for 1915.

Montana

Gold, Silver, Copper, Lead, and Zinc in Montana in 1914 (66793 N). V. C. Hicks. 40 pp. U S G S, I:21—Dec. 24, 1915. Statistics.

Montana (67892 A). Charles Copenhaver. Ills. 2000 w. M & E W—Feb. 5, 1916. Mining in 1915.

Activities in the Marysville Mining District, Montana (70005). L. S. Ropes. Ills. 1500 w. M & E W—April 29, 1916.

National

The Tale of the National Gold Mine—A Latter Day Bonanza (70354). Horace V. Winchell. 3000 w. M & E W—May 13, 1916.

Nevada

Gold, Silver, Copper, Lead, and Zinc in Nevada in 1914 (66793 N). V. C. Heikes. 60 pp. U. S. G S, I:19—Dec. 21, 1915. Statistics.

Nevada. R. L. Richie. Northern Nevada Mining Districts. W. D. Van Blarcom (67895 A). Ills. 2500 w. M & E W—Feb. 5, 1916. Mining during 1915.

The Yellow Pine District, Nev. (71816). Leroy A. Palmer. Ills. 2500 w. E & M J—July 15, 1916. Produced lead and zinc ore; gold and copper also found. Production increasing.

Consult Classification of the Index. See page 7.

Newfoundland

Mining Around Lovelock, Nevada (71562). P. B. McDonald. Ills. 1500 w. M & S P—July 1, 1916. Observations from an underground visit at the Rochester silver mine.

Notes on Some Mining Districts in Eastern Nevada (73565 A). James M. Hill. Maps & Ills. 190 pp. U S G S—Bul 648. Field work. A record of facts.

Review of Conditions in the Eureka Mining District, Nevada (73634). A. G. Hillen. Ills. 2500 w. M & E W—Sept. 30, 1916. Silver, lead, and gold ores. Various mining properties.

The Golden Arrow, Clifford, and Ellendale Districts, Nye County, Nevada (73737 N). Henry G. Ferguson. Ills. 10 pp. U S G S, Bul 640-F—Oct. 3, 1916. Three small mining camps described.

Newfoundland

Mineral Resources of Newfoundland (73430). P. W. Browne. 2000 w. C M J—Sept. 15, 1916. Copper, iron, coal, etc.

New Mexico

The Aztec Gold Mine, Baldy, New Mexico (68477 N). Willis T. Lee. Ills. 6 pp. U S G S, Bul 620-N—Jan. 15, 1916. Discovery, development, geology.

New Zealand

Mines Statement (65496 N). W. D. S. MacDonald. Ills. 110 pp. Report for 1914 by minister of mines on production, labor, etc.

Oatman

Oatman, Arizona—A Prohibition Camp (66971). Frank H. Probert. Ills. 3000 w. M & S P—Jan. 1, 1916. General and geological.

The Tom Reed-Gold Road Mining District, Arizona (66909). J. D. Sperr. Ills. 2000 w. E & M J—Jan. 1, 1916. Location, early history, present activity.

The Oatman District, Arizona (70481). Leroy A. Palmer. Ills. 4800 w. E & M J—May 20, 1916. Present status.

Oatman and the Tom Reed-Gold Road Mining District, Arizona (69248). Etienne A. Ritter. Ills. 2000 w. M & E W—April 1, 1916. Geology and general.

Ontario

Mining Districts of Northern Ontario (67414). Robert Livermore. Ills. 3000 w. M & S P—Jan. 15, 1916. Mining and geological features of region.

Mining in Ontario in 1915 (67167). Thomas W. Gibson. 1200 w. E & M J—Jan. 8, 1916. Gold, nickel, copper, and iron production.

The Geology and Mining Activities of Northern Ontario Mining Fields (69557). A. K. Stewart. Ills. 1800 w. M & E W—April 15, 1916. Review of development.

MINES AND DISTRICTS

Queensland

Oregon

Mining in Western Oregon (67810). E. C. Morse. Map. 1600 w. M & S P—Jan. 29, 1916. Chiefly describing porphyry dikes of Cascade Mts.

Peru

The Mining Industry of Peru (70371). Joseph T. Singewald, Jr., and Benjamin Leroy Miller. Ills. 5000 w. E & M J—May 13, 1916. Broad review.

The Cerro de Pasco District, Peru (70960). Joseph T. Singewald, Jr., and Benjamin LeRoy Miller. Ills. 3000 w. E & M J—June 10, 1916. Formerly a silver camp, now a copper producer.

Prominent Mines of Junin, Peru (73637). Joseph E. Lingewald and Benjamin Le Roy Miller, 3500 w. E & M J—Sept. 30, 1916. Three ore deposits of unusual interest, containing vanadium, bismuth, and silver.

Philippines

The Mineral Resources of the Philippine Islands for the year 1914 (65654 N). Ills. 35 pp. Philippine Bureau of Sci—1915. Eight short articles. Five by Wallace E. Pratt. Three by Victor E. Lednický. Statistics, production, and information.

The Iron Ores of the Philippine Islands (67951 D). Wallace E. Pratt. 5500 w. A I M E, Bul—Feb., 1916. Principal deposits.

Poland

Ueber die geologisch-montanistischen Verhältnisse und über die Bergbautätigkeit in Polen (68312 B). Franz Bartonec. Ills. 2000 w. M R—Feb. 1, 1916. Brief survey of geology, mining and present status of industry in Poland.

Porcupine

The Porcupine Gold Area (68224). A. G. Burrows. 3500 w. C M J—Feb. 15, 1916. Extracts from third report by Ontario Bureau of Mines.

Quebec

Report on the Copper Deposits of the Eastern Townships of the Province of Quebec (66849 N). J. Austin Bancroft. Ills. & Maps. 280 pp. Que. Dept Colon, Min, & Fish—1915. Field work to determine how many could be relied upon to contribute regularly to a copper smelter.

Preliminary Statement on the Mineral Production in the Province of Quebec During 1915 (68599 N). 1000 w. Dept. Mines and Fish, Quebec—Feb. 22, 1916.

Queensland

Queensland Mining Industry (69923 N). 117 pp. Q G M, J—March, 1916. Review of 1915.

Queensland Mineral Deposits (71800 N). B. Dunstan. 3000 w. Q G M J—

Rand

MINES AND DISTRICTS

Utah

June 15, 1916. Serial, 1st part. Review of occurrences, production, values and prospects. Deals with lesser known minerals; the present article is on mica.

Sundown Tin and Copper Mine, Ballandean (71799 N). J. H. Reid. Ills. 1500 w. Q G M JI—June 15, 1916. Developments during the last two years.

The Comet Mine, Sundown, Ballandean (71798 N). J. H. Reid. Ills. 1500 w. Q G M JI—June 15, 1916. Geology, development, lode and ore lenses of this tin and copper mine.

Petrography of the Mount Morgan Mine, Queensland (73277 D). W. E. Gaby. Ills. 20 pp. A I M E, Bul—Sept., 1916. Detailed description of the ores and rocks from microscopic study.

Rand

De Launay on Rand Gold (72143 B). David Draper. 3800 w. M Mg—July, 1916. DeLaunay's theories revived.

Far East Rand and Suggested Changes in the Gold Law (72757 B). R. N. Kotzé. Ills. 5500 w. M Mg—Aug., 1916. Analysis of mining conditions with a study of what constitutes a minimum area for profitable working.

The Far East Rand and the Government (72758 B). H. Foster Bain. Ills. 8000 w. M Mg—Aug., 1916. Critical discussion of R. N. Kotzé's article on suggested changes in the gold law.

Reports

Reports on Mining Districts—General Suggestions (73686). 4500 w. M & S P—Sept. 30, 1916. Procedure in reports.

Russia

Mining in the Russian Empire, 1915 (67169). John Power Hutchins. 2500 w. E & M J—Jan. 8, 1916. Effects of war: production, development, methods, etc.

Saskatchewan

A New Gold Area in Northern Saskatchewan and Manitoba (68408 N). E. L. Bruce. 2500 w. C M I, Trans—1915. Around Beaver Lake.

South Africa

An American's Impressions of South Africa (72741). H. Foster Bain. Ills. 4000 w. M & S P—Aug. 26, 1916. Interesting account of conditions.

South America

South America in 1915 (67165). 2500 w. E & M J—Jan. 8, 1916. Review by countries.

South Dakota

South Dakota (67896 A). Jesse Simmons. Ills. 1500 w. E & M W—Feb. 5, 1916. Review of 1915.

Southern States

Southern States (67900 A). T. Poole Maynard. Ills. 3000 w. M & E W—Feb. 5, 1916. Mining during 1915.

Spain

The Iron Mines of the Sierra Menera District of Spain (67949 D). Victor De Ysassi. Ills. 1000 w. A I M E, Bul—Feb., 1916. Mines and shipping methods. L'Industrie Espagnole Et La Guerre (73528 B). M. Knoblauch-Cottenet. Ills. 3800 w. La Nt—Sept. 2, 1916. Mining and metallurgical industries of Spain.

Tasmania

Reconnaissance of Country Between Recherche Bay and New River, Southern Tasmania (70176 N). W. H. Twelvetees. Ills. 38 pp. Tas Dept Mines, Geol Surv Bul 24—1916.

The Zinc-Lead Sulphide Deposits of the Read-Rosebery District (70175 N). Loftus Hills. Ills. 122 pp. Tas Dept Mines, Geol Surv Bul 23—1915. Part II—Rosebery group. General examination.

Transvaal

Transvaal Mining in 1915 (67168). H. F. Marriott. 2000 w. E & M J—Jan. 8, 1916. Production, improvements, etc.

Turkey

Minerals of Asiatic Turkey (65328). Map. 2500 w. Eng & Min Jour—Oct. 30, 1915. Important mineral region. Copper, mercury and antimony.

Die Mineralschätze der Türkei (70140 B). C. Doelter. 2000 w. M R—April 16, 1916. Serial, 1st part. Review of mineral resources of Turkey.

United States

A Preliminary Review of U. S. Mining in 1915 (67178). 17000 w. M & E W—Jan. 8, 1916. Preliminary review issued by the U. S. Geological Survey.

Mineral and Metal Production in the United States in 1915 (67882 A). 1500 w. M & E W—Feb. 5, 1916. Comparison with 1914.

Urals

The Urals and Their Mineral Wealth (70100 B). T. H. Preston. Ills. 5 pp. M Mg—April, 1916. General survey.

Uruguay

The Mineral Resources of Uruguay (71419 B). Rolf Marstrander. Map. 4000 w. M Mg—June, 1916. Geology, and minerals known.

Utah

Gold, Silver, Copper, Lead, and Zinc in Utah in 1914 (66794 N). V. C. Heikes. 40 pp. U S G S, I:20—Dec. 23, 1915. Statistics.

Mining in Utah in 1915 (67289). Edward R. Zalinski. 2500 w. E & M J—Jan. 15, 1916. Production of copper, gold, silver, lead and zinc ores.

Utah (67898 A). Percy M. Cropper. Ills. 2800 w. M & E W—Feb. 5, 1916. Mining during 1915.

Virginia

Notes on the Promontory District, Utah (69033 N). B. S. Butler and V. C. Heikes. Ills. 3000 w. U S G S, Bul 640-A—March 16, 1916. General report.

Virginia

The Louisa-Spottsylvania Mineral District of Virginia (71937). Justus H. Cline. Ills. 1000 w. M Rd—July 20, 1916. Deposits of lead and zinc.

Waihi

The Geology of the Waihi Grand Junction Mine (65905 N). Arthur Jarman. 4500 w. Inst of Min & Met, Bul. 134—Nov. 11, 1915. Discussion by H. Foster Bain and others.

Washington

Reconnaissance of the Conconully and Ruby Mining Districts, Washington (72619 N). Maps. Edward L. Jones, Jr. 25 pp. U S G S, 640 B—Aug. 12, 1916. Geography, geology, ore deposits, mines and prospects.

See Idaho.

Western Australia

The Mining Fields of Western Australia (69681 N). A. Gibb Maitland. Ills. 14 pp. Maps. Geol Sur W Aust—Bul 64, Rpt 59. General.

Geological Observations in the Mulline, Riverina, and Ullaring Centres, North Coolgardie Goldfield (69682 N). F. R. Feldtmann. Ills. 52 pp. Maps. Geol

MINOR MINERALS

Antimony

Sur W Aust—Bul 64, Rpt 60.

Certain Mining Centres at the South End of the Yalgoo Goldfield (69679 N). H. P. Woodward. Ills. 8 pp. Maps. Geol Sur W Aust—Bul 64, Rpt 55. Descriptive.

The Mining Geology of Yerilla, Northern Coolgardie Goldfield (69678 N). J. T. Jutson. Ills. 33 pp. Maps. Geol Sur W Aust—Bul 64, Rpt 53.

Willow Creek

The Willow Creek District, Alaska (65752 N). Stephen R. Capps. Ills. & Maps. 77 pp. U S Geol Surv—Bul. 607. Information concerning this gold-bearing district. Geography, geology, mineral resources, etc.

Wisconsin

Wisconsin (67897 A). J. H. Lewis. Ills. 6000 w. M & E W—Feb. 5, 1916. Review of 1915.

Witwatersrand

Rand Mining in 1915 (70203). A. Cooper Key. 1500 w. E & M J—May 6, 1916. Leading features of gold industry.

Yukon

Mining in the Yukon (65550). J. B. Tyrrell. Ills. 6000 w. Can Min Jour—Nov. 1, 1915. Methods, production, costs.

The Economic Possibilities of the Yukon (68403 N). D. D. Cairnes. Ills. 34 pp. C M I, Trans—1915. Future.

MINOR MINERALS

Allanite

The Radio-Activity of Allanite (70297 D). L. S. Pratt. 250 w. A I M E, Bul—May, 1916. Brief note on method of study and results.

Aluminum

Aluminium (72009 A). 2000 w. Eng—July 7, 1916. Its occurrence, characteristics, uses, production, etc.

Determination of Aluminium as Oxide (72734). William Blum. 18 pp. U S B S, Sci paper 286—Aug. 10, 1916. Experiments and conclusions.

Bauxite and Aluminium (72596 N). W. C. Phalan. 15 pp. U S G S, I:7—Aug. 16, 1916. Statistics of production, uses, etc.

Estimating Metallic Aluminium in Aluminium Dust (72460). J. E. Clennell. 1200 w. E & M J—Aug. 12, 1916. Additional particulars about methods of testing.

Notes on the Determination of Aluminium (72336 N). C. F. Sidener and Earl Pettijohn. 1800 w. J I & E C—Aug., 1916. The best procedure.

Antimony

Electrolytic Antimony Refining (65741 A). Anson G. Betts. 4000 w. Met & Chem Engng—Nov. 15, 1915. Read before Am. Elec-Chem Soc, San Francisco. Experiments and results.

Antimony (67210). 1200 w. M & S P—Jan. 8, 1916. Review of sources. Outline of metallurgy.

The Behavior of Stibnite in an Oxidizing Roast (67433 D). H. O. Hofman and John Blatchford. 1200 w. A I M E, Bul—Jan., 1916. Investigations and conclusions.

The Determination of Antimony in the Products Obtained by Roasting Stibnite (67434 D). William T. Hall and John Blatchford. 600 w. A I M E, Bul—Jan., 1916. Chemical work; analyses.

Nouveaux moyens de production de l'antimoine en France (67036 B). M. Biver. Ills. 2500 w. G C—Jan. 1, 1916. New antimony smelter in France.

Antimony Mining in Coeur d'Alene District, Idaho (68040). Robert L. Brainard. Ills. 2000 w. M & E W—Feb. 12, 1916. History, deposits, uses, etc.

Consult Classification of the Index. See page 7.

Arsenic

MINOR MINERALS

Feldspar

Antimony in China (68900). F. L. Cole. Ills. 4000 w. M & S P—March 11, 1916. Deposits; smelting; marketing.

Antimony Production in Hunan Province, South China (68690 N). A. S. Wheler. Ills. 5000 w. I M M, Bul 137—Feb. 17, 1916. Describes important producers.

Antimony Production in Hunan Province, South China (69168 N). 2000 w. I M M, Bul 138—March 16, 1916. Contributed remarks on Wheler's paper.

The Production of Antimony, Arsenic, Bismuth, Selenium, and Tellurium in 1914 (68475 N). Frank L. Hess. 30 pp. U S G S, I: 26—Feb. 26, 1916. Statistics.

Antimony Veins at Bernice, Nevada (69553). Willard Mallory. 900 w. M & S P—April 15, 1916. Two producing mines.

Determination of Antimony (71721). Harai R. Layng. 1200 w. M & S P—July 8, 1916. Rapid method.

Antimony Deposits of Alaska (72214 N). Alfred H. Brooks. Ills. & Maps. 60 pp. U S G S—Bul. 649. Occurrence, especially the Fairbanks district.

Arsenic

See Antimony.

Asbestos

Chrysotile-Asbestos (65936). F. H. Mason. 1200 w. Min & Sci Pr—Nov. 20, 1915. Canada contributes about 85 per cent of the world's production of asbestos of this variety.

Asbestos in 1915 (70614 N). J. S. Diller. Map. 1500 w. U S G S, II:4—May 24, 1916. Production, prices, etc.

Barium

The Barium Industry in the United States Since the European War (66947). Maximilian Toch. Ills. 2200 w. M & C E—Jan. 1, 1916. Explains economic conditions.

Bauxite

Bauxite: A Source of Aluminum (66814 A). 2500 w. Eng—Dec. 17, 1915. Treatment—furnace; forms; sources.

Aluminum Hydrates in the Arkansas Bauxite Deposits (69772 B). D. C. Wyssor. 2000 w. E G—Jan., 1916. Investigations and conclusions.

Bismuth

See Antimony.

Bitumens

Asphalt, Related Bitumens, and Bituminous Rock in 1915 (71955). John D. Northrop. 15 pp. U S G S, II: 13—July 13, 1916. Occurrence, distribution, and production in the United States.

Cadmium

See Zinc under *Miscellany*.

Carnotite

Extraction and Recovery of Radium, Uranium and Vanadium from Carnotite (66733 N). Charles L. Parsons, R. B. Moore, S. C. Lind and O. C. Schaefer. Ills. 112 pp. U S B M—Bul. 104.

Chemical Industry

The Possibilities for the Manufacture of Chemicals of the Alkali and Alkaline Earth Groups in South (73136 A). Richard K. Meade. 4500 w. M Rd—Sept. 14, 1916. The resources and inducements.

Clay

Future of the Clay Products Industry in Eastern Canada (68411 N). J. Keele. 4000 w. C M I, Trans—1915. Development and prospects.

Cobalt

Cobalt: Its Possible Uses (71406). F. H. Mason. 1500 w. M & S P—June 24, 1916. Many possibilities of use.

Magnetic Properties of Cobalt and of Fe, Co (73423 N). Herbert T. Kalmus and K. B. Blake. 18 pp. C D M—No. 413. Research work on Canadian minerals.

See Tin.

Cryolite

The Cryolite Mine at Ivigtut, Greenland (70101 B). Clinton P. Bernard. Ills. 2 pp. M Mg—April, 1916. Brief description.

Diamonds

The Vaal River Diggings in Griqualand West (67740 A). Charles W. Boise. Ills. 2500 w. M Mg—Jan., 1916. Alluvial workings.

Diatomaceous Earth

Diatomaceous Earth Deposits in Denmark (68889 N). E. A. Manners. Ills. 3 pp. M M—Mar., 1916. General description.

Emerald

The Emerald Deposits of Muzo, Colombia (70293 D). Joseph E. Pogue. Ills. 24pp. A I M E, Bul—May, 1916. Information, and observations during a recent visit.

Fertilizers

The Fertilizer Situation in the United States (67129). D. F. Houston. 3000 w. M Rd—Jan. 6, 1916. Supply of potash, phosphate and nitrogen.

Feldspar

Feldspar in 1915 (71424). Frank J. Katz. 11 pp. U S G S, II: 7—June 26, 1916. Composition and properties, geology, methods of mining and milling, uses.

The Feldspars of the New England and North Appalachian States (70868 A). A. S. Watts. Ills. & Maps. 170 pp. U S B M—Bul. 92. Min. Tech. 9. Investigations. Availability, grades, and uses.

Consult Classification of the Index. See page 7.

Fire Clay

Fire Clay

Pennsylvania Fire Clay (67962 D). L. C. Morganroth. 2500 w. A I M E, Bul—Feb., 1916. Pottsville conglomerate series and upper measures.

Fluorspar

The Fluorspar Mine in Colorado (66704). Horace F. Lunt. Map. 1000 w. M & S P—Dec. 18, 1915. Descriptive.

Fuller's Earth

Fuller's Earth in 1915 (70407 N). Jefferson Middleton. 1000 w. U S G S, II:3—May 6, 1916. Statistical.

Garnet

Garnet Deposits on the Navajo Reservation, Arizona and Utah (71012 B). Herbert E. Gregory. 1800 w. E G—April-May, 1916. Distribution, occurrence, sources, etc.

Graphite

Graphite in Madagascar (71421 B). John W. Shelley. Map. 5000 w. M Mg—June, 1916. Deposits, and methods of mining and dressing.

Graphite in 1915 (71418). Edson S. Bastin. 12 pp. U S G S, II: 11—June 26, 1916. Production by states and territories.

Graphite Mining Activity in Alabama (72915). Y. A. Dyer. 2000 w. M Rd—Aug. 31, 1916. Information concerning these important deposits and their development.

Graphite Industry in New York (74171). Robert W. Jones. Ills. 1500 w. E & M J—Oct. 28, 1916. Production chiefly from Adirondack region.

Gypsum

Report of Committee C-11 on Gypsum and Gypsum Products (71450 N). 55 pp. A S T M—June, 1916. Proposed specifications, tests, and terms used.

Gypsum in 1915 (72030 N). Ralph W. Stone. 9 pp. U S G S, II: 14—July 19, 1916. Production, conditions, etc.

Gypsum and Lime Industry in Central Montana (73936). O. W. Freeman. Ills. 1800 w. M & E W—Oct. 14, 1916. The deposits and their development.

Louisiana

Industrial Resources of Louisiana (71035 A). C. S. Williamson, Jr. 5800 w. L E S, Pro—June, 1916. Petroleum, gas, salt, sulphur, and other resources.

Magnesite

The Production of Magnesite in 1914 (65756 N). Charles G. Yale and Hoyt S. Gale. Map. 18 pp. U S Geol Surv, II: 30—Oct. 28, 1915. Character, production, uses, etc.

Sonoma Magnesite Mines, Calif. (72096). Lewis H. Eddy. Ills. 1700 w. E & M J—July 29, 1916. Development of a magnesite property.

MINOR MINERALS

Molybdenum

Magnesite Production and Markets (72450). Saul H. Dolbear. Ills. 1200 w. M & S P—Aug. 12, 1916. Deals mainly with production in California and Canada.

Manganese

High Grade Manganese Ores of Brazil (68136 A). Joseph T. Singewald, Jr., and Benjamin Miller. Ills. 3000 w. I A—Feb. 17, 1916. Important deposits of Minas Geraes.

Mining of Manganese Ore in Virginia (69172 A). Ills. 1000 w. I A—March 30, 1916. At Crimora mine.

Notes on Manganese in East Tennessee (69688 N). A. H. Purdue. 13 pp. R T—April, 1916. Deposits.

Owl Head Manganese Deposit, San Bernardino County, California (69558). R. L. Mann. Map. 1000 w. M & E W—April 15, 1916.

Manganese Ores of Russia, India, Brazil and Chile (70292 D). E. C. Harder. Maps. 38 pp. A I M E, Bul—May, 1916. Compiled information.

Some Manganese Beds in Virginia and Maryland (71312 N). D. F. Hewlett. 71 pp. N S G S—Bul. 640-C. Location, nature and persistence of deposits.

Manganese and Manganiferous Ores in 1915 (72075 N). D. F. Hewlett. 14 pp. U S G S, I: 4—July 25, 1916. Sources, production, volume, etc.

The Manganese Ores of the Lafayette District, Minas Geraes, Brazil (73738 D). Joseph T. Singewald, Jr. and Benjamin Leroy Miller. Ills. 18 pp. A I M E Bul—Oct., 1916. Information.

Mica

Mica in 1915 (73317 N). Waldemar T. Schaller. 14 pp. U S G S, II: 21—Sept. 16, 1916. Properties, occurrence, uses, etc.

Molybdenite

Notes on Molybdenite Operations in Norway (71769 N). H. H. Claudet. 2500 w. C M I, Bul—July, 1916. Deductions from experience.

Molybdenite: Its Occurrence and Treatment in New South Wales (73119 N). E. C. Andrews. 2000 w. M & E R—Aug., 1916. Uses, treatment, geology, etc.

Molybdenum

Molybdenite in the Mount Perry District (65735 N). Lionel C. Ball. Ills. 2500 w. Queens Gov Min Jour—Oct. 15, 1915. A recent discovery.

Notes on the Geology of the "Molly" Molybdenite Mine, Lost Creek, Nelson Mining Division, B. C. (65799 N). Charles W. Drysdale. 2500 w. Can Min Inst, Bul—Nov., 1915. Uses of molybdenum; Canadian occurrences; description of mine named.

Nickel

MINOR MINERALS

Potash

The Sampling and Assaying of Molybdenum Ores as Practiced by the Orillia Molybdenum Company, Ltd., Orillia, Canada (69816). B. C. Lambie. 1200 w. C M JI—April 15, 1916. Methods and uses.

Some New Methods of Testing for Molybdenum (70471 N). James Moir. 600 w. C M M S S A, JI—March, 1916.

See also Tin, Molybdenite and Tungsten, under *Ore Dressing*.

Nickel

See Tin.

Nickel Ores

Chief Minerals of the Sudbury Nickel Ores (72700). A. P. Coleman. Ills. 1200 w. C M JI—Aug. 15, 1916. Discusses pyrrhotite, pentlandite, and chalcopyrite.

The Occurrence and Utiliation of Nickel Ores (73760 N). 25 pp. I I Bul—April-June, 1916. Production, occurrence, metallurgical treatment, uses, etc.

Nitrates

The Genesis of the Chilean Nitrate Deposits (70494 B). Joseph T. Singewald, Jr., and Benjamin LeRoy Miller. 3500 w. E G—March-April, 1916. Study of their localization and the general problem.

Origin of Nitrate (70230). Courtenay De Kalb. 1100 w. M & S P—May 6, 1916. Analogy between the Rodeo Valley, N. M., and Andean plateau.

See Nitrogen, under ELECTRICAL ENGINEERING, *Electrochemistry*.

Ozokerite

Ozokerite in Central Utah (71308 N). Heath M. Robinson. Map. 16 pp. U S G S—Bul. 641-A. Geology of field, properties and composition, and production.

Ozokerite in Utah (71162). L. O. Howard. Map. 3300 w. M & S P—June 17, 1916. Deposits, their value and use.

Phosphates

Discovery of Phosphate Rock in the Rocky Mountains (67031 N). Frank D. Adams and W. J. Dick. Ills. 36 pp. Comm of Conserv, Can., 1915. Successful scientific prospecting.

The Use of Low Grade Phosphates (67950 D). James A. Barr. 1000 w. A I M E, Bul—Feb., 1916. Recovery; suggestions for use.

A Reconnaissance for Phosphate in the Salt River Range, Wyoming (68478 N). G. R. Mansfield. Plate. 19 pp. U S G S, Bul 620-O—Feb. 23, 1916. Investigation and results.

Investigation of a Reported Discovery of Phosphate in Alberta (68653 N). Hugh S. de Schmid. Ills. 38 pp. C D M, Bul 12—No. 385. Unfavorable.

Phosphates and Dolomites of Johnson County, Tennessee (69686 N). Olaf P. Jenkins. Ills. 56 pp. Maps. R T—April, 1916. General and thorough description.

Phosphate Rock in 1915 (73819 N). W. C. Phalen; with Simple Tests for Phosphate, by W. B. Hicks. Map. 17 pp. U S G S, II:18—Oct. 6, 1916. Production, imports, exports, etc.

The Conservation of Phosphate Rock in Tennessee (73901 N). W. C. Phalen. Ills. 22 pp. R T—Oct., 1916. Production, occurrence, means of conserving, etc.

Platinum

Les gisements de platine de l'Oural (68811 B). Louis Duparc. 6 pp. S I C F Pro-Ver—Jan. 28, 1916. Brief description of platinum deposits in the Ural.

Platinum at the Boss Mine, Goodsprings, Nevada (69241). Frank A. Crampton. Ills. 2500 w. M & S P—April 1, 1916. Geological data.

Platinum Substitutes

A Development of Practical Substitutes for Platinum and Its Alloys, with Special Reference to Alloys of Tungsten and Molybdenum (67435 D). Frank Alfred Fahrenwald. Ills. 45 pp. A I M E, Bul—Jan., 1916. Metallurgical research work and results; especially for dental work.

Potash

Potash from Wood and Plant Ashes (65739 A). Harlow Bradley. 5000 w. Met & Chem Engng—Nov. 15, 1915. History and manufacture, possible improvements in method, uses, etc.

Potash in Certain Copper and Gold Ores (65843 N). B. S. Butler. With a note on muscovite by George Steiger. 2200 w. U S Geol Surv, Bul 620-J—Nov. 15, 1915. Analyses from different districts showing the potash content.

Possible Sources of Potash in America (66517 B). Frank K. Cameron. 4000 w. F I—Dec., 1915. Large potential supply.

Recent Alunite Developments Near Marysvale and Beaver, Utah (66360). G. F. Loughlin. Maps. 34 pp. U S G S, Bul 620-K—Dec. 3, 1915. Report of field work during 1914.

Potash in Certain Copper Ores and Tailings (66396). B. S. Butler. 1200 w. M & E W—Dec. 11, 1915. Analyses of ores from different districts.

Evaporation of Potash Brines (67383 N). W. B. Hicks. 3000 w. U S G S, Prof. paper 95-E—Oct. 25, 1915. Experiments and results.

American Potash (67808). Carl Elschner. 1200 w. M & S P. Jan. 29, 1916.

Consult Classification of the Index. See page 7.

Production

MINOR MINERALS

Stone

Manufacture at Keeler, Calif., from natural brines.

Evaporation of Brine from Searles Lake, California (68364 N). W. B. Hicks. 8 pp. U. S. G. S., Prof. paper. 98-A—Feb. 21, 1916. Experiments and results.

Potash from Fir Wood Mill-Waste (67756 N). Harper F. Zoller. 2000 w. J. I. E. C.—Feb., 1916. Results of experiments.

Potash from Kelp (68784). I. F. Laucks. Ills. 4500 w. M & C E—March 15, 1916. Handling commercially.

Potash from Kelp in Southern California (69274). H. L. Glaze. 2500 w. M & C E—April 1, 1916. Attempts to utilize.

Recovery of Potash at Security Cement Plant (70321). Ills. 2200 w. M Rd—May 11, 1916. Source of supply.

The Blast Furnace as a Potash Producer (70320). Charles Catlett. 1800 w. M Rd—May 11, 1916. Possibilities.

Potash Salts, 1915 (71741 N). W. C. Phalen. With simple Tests for Potash, by W. B. Hicks. 37 pp. U. S. G. S., II: 12—June 30, 1916. Domestic conditions; imports; work, etc.

Simple Tests for Potash (72343). W. B. Hicks. 1400 w. M & S P—Aug. 5, 1916. Require only slight knowledge of chemistry.

Potash as a By-Product in the Cement and Iron Industries (73134 A). Ernest F. Burchard. 4000 w. M Rd—Sept. 14, 1916. Statistics showing the bearing on southern industries.

Southern Iron Ores as a Source of Potash (73137 A). John S. Grasty. 2000 w. M Rd—Sept. 14, 1916. Recovery by the Cottrell process.

Can an American Potash Industry Be Established? (73654 A). Emil D. Koepfing. 3300 w. M & C E—Oct. 1, 1916. Favorable to the establishment.

Production

Secondary Metals in 1915 (71954). J. P. Dunlop. 8 pp. U. S. G. S., I: 3—July 15, 1916. Secondary recoveries of copper, zinc, lead, tin, antimony and aluminum.

Quicksilver

Das Zinnobervorkommen von Idria in Krain unter Berücksichtigung neuerer Aufschlüsse (65479 B). A. Pilz. Ills. 6000 w. Glick—Oct. 30, 1915. Serial, 1st. part. New developments in the quicksilver deposits of Idria; chiefly geology.

Quicksilver Mining in California (68285). W. H. Landers. Ills. 1800 w. M & S P—Feb. 19, 1916. Mining and reduction.

Radioactive Substances

Determinación del contenido radioactivo de las sales en las aguas del Atlántico

y del Pacífico entre Montevideo y el Callao (65486 N). Urbano Mialock. Ills. 9 pp. Soc. Cien. Arg. An—May-June, 1915. Study of radioactivity of salt from sea water around southern South America.

Radium

Radium (68416 N). F. A. Ross. Ills. 3800 w. C. M. I., Trans—1915. General. See also Tin.

Rare Earths

Progress of the British Rare Earth Industry During the War (72548 A). Sydney J. Johnstone. 1000 w. I & C. T. R—July 28, 1916. Manufacture and utilization of thoria and ceria.

Salt

The Salt Industry of Central Kansas (67543). Charles I. Corp. Ills. 3000 w. W. E—Jan., 1916. Methods and processes.

Der Steinsalzbergbau in Marosujvár (Siebenbürgen) (68313 B). M. Przyborski. Ills. 2800 w. M R—Feb. 1, 1916. Deposits and operations in salt mining at Marosujvár, Hungary.

Salt Industry and Resources of the Philippine Islands (69131 N). Alvin J. Cox and T. Dar Juan. 17 plates. 25 pp. P. J. I. S—Nov., 1915. History and processes.

Salt, Bromine, and Calcium Chloride in 1915 (72835 N). W. C. Phalen. 10 pp. U. S. G. S., II: 20—Aug. 23, 1916. Production, consumption, etc.

Chinese Methods of Salt Production (74077 A). 1000 w. R. S. A. J. I—Oct. 6, 1916. Information of interest.

Sand

Sand and Gravel in 1915 (72595 N). R. W. Stone. 12 pp. U. S. G. S. II: 17—Aug. 7, 1916. Statistics.

Selenium

See Antimony

Silica

Silica in 1915 (71309 N). Frank J. Katz. 3600 w. U. S. G. S.—Part II: 8. Mineral Resources of the United States. Uses, production and sales.

Slate

Slate in 1915 (70879). G. F. Loughlin. 13 pp. U. S. G. S., II: 5—May 25, 1916. Statistics.

Soda

Les lacs de soude de l'Est Africain Anglais et Allemand (68812B). Victor Cambon. Ills. 800 w. Brief description of soda lakes in British and German East Africa.

Stone

The Stone Industry in 1914 (67377 N). G. F. Loughlin. 70 pp. U. S. G. S., II: 33—Dec. 31, 1915. Statistical data, and historical review since 1880.

Consult Classification of the Index. See page 7.

Talc

MINOR MINERALS

Tungsten

Talc

Talc and Soapstone (71416). J. S. Diller. 1000 w. U S G S, II: 9—June 27, 1916. Production, prices, etc.

Tellurium

See Antimony.

Tin

Tin and Tungsten in the West of England (65431 A). J. H. Collins. 2400 w. Min Mag—Oct., 1915. History and situation.

The Physical Condition of Cassiterite in Cornish Mill Products (65906 N). 1800 w. Inst of Min & Met, Bul. 134—Nov. 11, 1915. Continued discussion of J. J. Beringer's paper.

Tin Industry in 1915 (67157). 1800 w. E & M J—Jan. 8, 1916. Review; smelting in the United States; tin in Bolivia.

Cassiterite in San Diego County, California (67473 N). Waldemar T. Schaller. Map. 1200 w. U S G S, Bul 620-P—Jan. 15, 1916. Describes deposit.

Tin Industry and Consumption in 1915 (67889 A). 700 w. M & E W—Feb. 5, 1916. Prices, production, consumption.

Tin and Tungsten in Portugal (67739 A). Thomas A. Down. Ills. 6 pp. M Mg—Jan., 1916. Report of exploration; status of industry.

Cassiterite in San Diego County, California (68479 N). Waldemar T. Schaller. Map. 1100 w. U S G S, Bul 620-P—Jan. 15, 1916. Not found in quantity.

The Production of Cobalt, Molybdenum, Nickel, Tin, Titanium, Tungsten, Radium, Uranium, and Vanadium in 1914 (68474 N). Frank L. Hess. 24 pp. U S G S, I: 25—Feb. 26, 1916. Statistics.

Boulder West Mine, Gurrumbah (69165 N). E. Cecil Saint-Smith. Ills. 2200 w. Q G M JI—Feb. 15, 1916. Descriptive.

The Nature of Nigerian Tin Deposits (71420 B). H. E. Nicholls. Ills. 1700 w. M Mg—June, 1916. Modes of occurrence of cassiterite.

Tin Smelting at Perth Amboy, N. J. (70664). Richard H. Vail. Ills. 2500 w. E & M J—May 27, 1916. Smelting Bolivian ores in reverberatory furnaces. Refined electrolytically.

The Bolivian Tin Industry (72019). Howland Bancroft. Map. 5500 w. M & S P—July 22, 1916. Revised paper, read before second Pan-Am. Cong. Production, consumption, ownership, methods, smelting, etc.

Titanium

See Tin.

Tungsten

Wolframite Mining in the Tavoy District, Lower Bureau (66699 N). 6000 w. I M M, Bul 135—Dec. 9, 1915. History and detailed description of methods, etc.

The Black Hills of South Dakota a Good Producer of Tungsten (65904). Jesse Simmons. 500 w. M & E W—Nov. 20, 1915. Known areas of tungsten ores.

Scheelite Mining and Grading (67211). P. B. McDonald. Ills. 1000 w. M & S P—Jan. 8, 1916. Occurrence in gold-quartz ore; graded by eye.

Wolframite Mining in the Tavoy District, Lower Burma (67591 N). 4500 w. I M M—Jan. 13, 1916. Discussion of E. Maxwell-Lefroy's paper.

The Chemistry and Metallurgy of Tungsten (68320 N). M. L. Hartmann. 3500 w. Pah Qt—Feb., 1916. Characteristics of metal and methods of reduction.

The Geology of Tungsten Deposits (68319 N). J. J. Runner. Ills. 2000 w. Pah Qt—Feb., 1916. General review.

Wolframite Mining in the Tavoy District Lower Burma (69169 N). 5000 w. I M M, Bul 138—March 16, 1916. Contributed remarks on E. Maxwell-Lefroy's paper.

Wolframite and Scheelite at Leadville, Colorado (69770 B). R. S. Fitch and G. F. Loughlin. 2000 w. E G—Jan., 1916. Preliminary description.

Notes on the Tungsten Ores of the Southwest (70789). H. H. Taft. 1500 w. M & E W—June 3, 1916.

The Tungsten Mines of Atolia (70670). Charles T. Hutchinson. Ills. 1800 w. M & S P—May 27, 1916. Information concerning these producers in California.

Tungsten District of Boulder County, Colorado (70669). Charles T. Kirk. Map & Ills. 3000 w. M & S P—May 27, 1916. Physical features, veins, mineralization, prospecting, etc.

Tungsten Mining in Arizona (70828). Charles F. Willis. Map. 1800 w. M & S P—June 3, 1916. Reports by districts.

The Boulder County Tungsten District, Colo. (71973). Harry J. Wolf and Percy P. Barbour. Ills. 3000 w. E & M J—July 22, 1916. The district and its features.

Specific Gravity Method for Tungsten Analysis (71561). J. J. Runner. 2000 w. M & S P—July 1, 1916. Additional information to that supplied by A. D. Cox.

The X-Ray Spectrum of Tungsten (71493). A. W. Hull. Ills. 3500 w. G E R—July, 1916. Graphic description of the way X-ray spectra are formed.

Tungsten in the Boulder District, Colorado (72961). E. H. Leslie. Ills. 1800 w. M & S P—Sept. 2, 1916. Describes field and milling practice.

See also same heading under ELECTRICAL ENGINEERING, Illumination; also Tin, and Tungsten under Ore Dressing and Concentration.

Consult Classification of the Index. See page 7.

Uranium**Uranium**

See Tin.

Vanadium

See Ore Dressing.

Zinc

Zink (67708 B). J. Mendel. 14 pp. T u W—Dec., 1916. Serial, 1st part. Statistical discussion of zinc production.

The Occurrence and Utilisation of Zinc Ores (72311 D). 36 pp. I I Bul—Jan.-Mar., 1916. Production and occurrence in countries other than British.

Ore Genesis and Contact Metamorphism at the Long Lake Zinc Mine, Ontario (71013 B). W. L. Uglow. Ills. 15 pp. E G—April-May, 1916. Occurrence, location, development, etc.

OIL AND GAS**Gasoline**

The Roitsheirn-Remy Continuous Zinc Distillation Process (70732). M. Liebig. Ills. 4000 w. M & C E—June 1, 1916. An invention that promises to revolutionize zinc smelting.

Zinc, Its Production and Industrial Applications (71016 A). J. C. Moulden. Map. 14500 w. R S A, JI—May 26, 1916. Serial, 1st part. History, nature, occurrence, distribution, etc.

Great Activity in the North Arkansas Zinc Fields (72082). Thomas Shiras. Ills. 1000 w. M & E W—July 29, 1916. Report of this field.

Zircon

Zircon-Bearing Pegmatites in Virginia (71759 D). Thomas L. Watson. 7 pp. A I M E, Bul—July, 1916.

OIL AND GAS**California**

Notes on Santa Maria Oilfields (66406 A). Paul W. Prutzman. Read before Am. Petroleum Soc. 1500 w. W E—Dec., 1915. California field.

Geology and Oil Prospects of Cuyama Valley, California (68482 N). Walter A. English. Maps and Ills. 25 pp. U S G S, Bul 621-M—Feb. 23, 1916. Report.

Canada

Petroleum and Natural Gas Resources of Canada. Vol. II. (67011 N). Frederick G. Clapp and others. Ills. 404 pp. C D M—No. 291. Occurrences.

Coal Oil

Fuel Oils from Coal (68906A). Harold Moore. Read before Manchester Assn. of Engrs. 4500 w. Mch E—March 3, 1916. Methods for carbonization.

Conservation

Conservation of the Oil and Gas Resources of the Americas (71011 B). Ralph Arnold. 20 pp. E G—April-May, 1916. Serial, 1st part. Possibilities of oil industry in the Americas.

Cracking Process

The Formation of Aromatic Compounds from the Cracking of a Gas Oil (71575). Gustav Egloff and Thomas J. Twomey. 1400 w. M & C E—July 1, 1916. Experimental investigation.

Crude Oil

Influence of Viscosity in Pumping Crude Oil (71618). Arthur L. Collins. 2500 w. E N—July 6, 1916. Importance in designing lines and pumping stations.

Dakota Sand

Oil, Gas, and Water Contents of Dakota Sand in Canada and United States (66415 D). 1200 w. A I M E Bul—Dec., 1915. Discussion of L. G. Huntley's paper.

Deposits

The Diastrophic Theory (71754) D). Marcel R. Daly. 20 pp. A I M E, Bul—July, 1916. Study of the mechanics of oil and gas accumulation in commercial deposits.

Drilling

The Evolution of Drilling Rigs (65532 D). R. B. Woodworth. Ills. 15500 w. Am Inst of Min Engrs, Bul—Nov., 1915. Development of the application of steel and other data.

The Development of the Steel Drilling-Rig (66402 A). R. B. Woodworth. Read before Am. Petroleum Soc. 4500 w. W E—Dec., 1915. History

The Evolution of Drilling Rigs (70307 D). 3000 w. A I M E, Bul—May, 1916. Discussion of Woodworth's paper.

Fire Fighting

Foam System Installation for Fighting Oil Fires (69697). C. P. Bowie. Ills. 2800 w. E N—April 27, 1916. At Coalinga, Calif.

Fire Hazard

Factors Affecting Fire Hazard of Oil Producing and Refining Properties (66403 A). A. W. Gunnison. Abstract of paper before Am. Petroleum Soc. 1500 w. W E—Dec., 1915. Precautions.

Fires

Accidentes en los grandes pozos de petroleo (68835 N). Julio Baz. Ills. B P—Feb., 1916. Mexican well fires and their extinguishment.

Gasoline

Manufacture of Gasoline by the Action of Aluminum Chloride on High Boiling Petroleum (65616). A. M. McAfee. Read before Am. Inst. of Chem. Engrs., at San Francisco. 3500 w. Am Gas Lgt Jour—

Gasoline

Nov., 8, 1915. The problem and its solution.

The Future of the Country's Gasoline Output (67563 A). Alexander E. Outerbridge, Jr. 1500 w. I A—Jan. 27, 1916. Demand exceeds supply. Rittman and Hall processes.

Gasoline from "Synthetic" Crude Oil (67440 D). 1200 w. A I M E, Bul—Jan., 1916. Discussion of paper of Walter O. Snelling.

Gasoline (68304 N). Ills. 27 pp. Senate Document No. 310—Feb. 3, 1916. Letter from Secretary of Interior, summarizing situation in gasoline production and causes for rise in price.

Experiments on the Production of Gasoline from Hydrocarbon Oils of High Boiling Point (67758 N). Earle L. Davies. Ills. 3000 w. J I E C—Feb., 1916. Description of new process.

The Gasoline Question (70550). 3000 w. M & S P—May 20, 1916. Standard Oil not responsible for high prices.

The California Gasoline Industry (70895 D). W. R. Hamilton. 1800 w. A I M E, Bul—June, 1916. Information concerning past production and the future outlook.

The Extraction of Gasoline from Natural Gas by Absorption Methods (70736). G. A. Burrell, P. M. Biddison, G. G. Oberfell. Read before Nat. Gas. Assn. of Am. Ills. 7500 w. M & C E—June 1, 1916. Method of absorbing the gasoline and separating by distillation.

Gilsonite and Grahamite: the Result of the Metamorphism of Petroleum Under a Particular Environment (70822 N). Clifford Richardson. 700 w. J I & E C—June, 1916. Two forms of bitumen, and their origin.

Motor Equipments for the Recovery of Petroleum (71220 D). W. G. Taylor. Ills. 14 pp. A I E E, Pro—June, 1916. Oil well equipments.

The Occurrence of Petroleum in the Philippines (71014 B). Wallace E. Pratt. Map. 20 pp. E G—April-May, 1916. Geology; occurrence; location, and exploitation.

Catalysis in the Formation of Gasoline from Kerosene (71805). Gustav Egloff and Robert J. Moore. 2500 w. M & C E—July 15, 1916. Treats of the three phase system for the conversion of hydrocarbon oils into gasoline.

Construction and Operation of a Single-Tube Cracking Furnace for Making Gasoline (72350). C. P. Bowie. Ills. 12 pp. U S B M—Tech paper 161. Outlines principles of the Rittman process.

The Effect of Aluminum Chloride Upon a Naphthene Base Oil in the Formation

OIL AND GAS

of Gasoline, Unsaturated and Aromatic Hydrocarbons (73312 A). Gustav Egloff and Robert J. Moore. 9000 w. M & C E—Sept. 15, 1916. Experimental procedure and data.

See same heading under MECHANICAL ENGINEERING, *Combustion Motors*.

Hydro-Carbon Oils

The Thermal and Pressure Decomposition of a Naphthene Base Oil in the Gas Phase (73655 A). Gustav Egloff, Thomas J. Twomey and Robert J. Moore. 4500 w. M & C E—Oct. 1, 1916. Effect in the formation of gasoline, unsaturated and aromatic hydrocarbons.

Illinois

Petroleum in Illinois in 1914 and 1915 (70264 N). Fred H. Kay. 18 pp. Ill State Geol Surv—Extract from Bul. No. 33. Production and plants.

Kansas

See *Coal and Coke*.

Louisiana

Enormous Oil Production Increase in Fields of North Louisiana (66104). Grant Richardson. 1500 w. M Rd—Dec. 2, 1915. Production; rapid development.

Mexican Oil

Apuntes Sobre La Region Petrolifera Tabasco-Chiapas (72794 A). J. D. Villarello. 4200 w. B P—July, 1916. Description of the country, with notes on occurrence, geological structure and means of communication with the oil region.

Mexico Y Su Petroleo (72795 A). Felipe Llanas. 2600 w. B P—July 1916. General review of development of the Mexican Oil Industry.

The Effect of Igneous Intrusions on the Accumulation of Oil in the Tampico-Tuxpam Region, Mexico (66295 B). E. De Golyer. 3500 w. E G—Nov.-Dec., 1915. Conclusions from study.

Mississippi

Structure of the Vicksburg-Jackson Area, Mississippi, with Special Reference to Oil and Gas (72028 N). Oliver B. Hopkins. Map. 28 pp. U S G S, Bul 641-D—July 13, 1916. Topography, geology, possibilities of oil and gas.

Montana

Possibilities of Oil and Gas in North-Central Montana (72029 N). Eugene Stebinger. Ills. & Map. 42 pp. U S G S, Bul 641-G—July 17, 1916. Geology, local features, possible occurrence.

Natural Gas

Natural Gas—Its Occurrence and properties (66381). Dorsey Hager. Ills. 3000 w. E & M J—Dec. 11, 1915. General résumé.

The Productions of Natural Gas in 1914. (66643 N). John D. Northrop. 70 pp. U S G S, II:32—Dec. 15, 1915. Statistics.

Ohio

The Compressibility of Natural Gas at High Pressure (68382 N). G. A. Burrell and I. W. Robertson. Ills. 800 w. U S B M—Tech. paper 131. Investigation of gas supplied to Pittsburgh.

Necessary Use and Effect of Gas Compressors on Natural Gas Field Operating Conditions (67953 D). Samuel S. Wyer. Ills. 4000 w. A I M E, Bul—Feb., 1916. Abridged report of investigation.

Development of the Law Relating to the Use of Gas Compressors in Natural Gas Production (67952 D). Samuel S. Wyer, 1000 w. A I M E, Bul—Feb., 1916. Chronological report of court decisions on the question.

Development of the Law Relating to the Use of Gas Compressors in Natural Gas Production (70306 D). 2500 w. A I M E, Bul—May, 1916. Discussion of Wyer's paper.

Deviation of Natural Gas from Boyle's Law (72982 A). Robert F. Earhart, and Samuel S. Wyer, with discussion. Ills. 14 pp. A S M E, JI—Sept., 1916. Tests, with apparatus used and methods followed, and data obtained. An important research.

Establishing a Standard of Measurement for Natural Gas in Large Quantities (72981 A). Francis P. Fisher, with discussion. Ills. 14 pp. A S M E, JI—Sept., 1916. Methods employed by a company operating over 1,200 miles of pipe lines.

Ohio

Natural Gas in Ohio (69136 A). J. A. Bownocker. Maps. Also discussion. 20 pp. C E S, JI—March, 1916. Discovery and development.

Oil Expansion

The Coefficient of Expansion of California Crude Oils and Distillates (66401 A). A. S. Crossfield. Read before Am. Petroleum Soc. 3000 w. W E—Dec., 1915. Summary of results of investigation by Bureau of Mines.

Oil Flow

See same heading under CIVIL ENGINEERING, Measurement.

Oil Reservoirs

Steel Arches Are Designed to Eliminate Rim Tension in Oil Reservoirs (73255). Henry R. Post. Ills. 1800 w. E R—Sept. 16, 1916. New design involves use of concrete abutments carrying arches made of thin steel plates.

Oil Shales

Fuel Oil from Shale (68336 A). Dr. A. Selwyn-Brown. 4000 w. E M—March, 1916. Outline of process; possibility of North American development.

Lowmead No. 1 Bore, and the Tertiary Oil-Shales of Battle Creek (68204 N).

OIL AND GAS

Petroleum Production

Lionel C. Ball. Ills. 4000 w. Q G M JI—Jan., 1916. Results of boring.

Oil Wells

The Use of Mud-Laden Fluid in Oil and Gas Wells (74194). James O. Lewis and William McMurray. Ills. 75 pp. U S B M—Bul 134. Merits of the system and its practical use.

Oklahoma

Amazing Conditions of Activity in Oil Fields of Oklahoma (67257). C. M. Sarchett. 1800 w. M Rd—Jan. 13, 1916. Gasoline demand increases business.

Petroleum

Emulsified or Cut Petroleum (72335 N). Charles K. Francis. Ills. 1200 w. JI I & E C—Aug., 1916. The nature and proper treatment of such oils.

Density and Thermal Expansion of American Petroleum Oils (73493). H. W. Bearce and E. L. Pepper. Ills. 24 pp. U S B S, Tech paper 77—Aug. 26, 1916. Experimental work to secure data from which to calculate standard density and volumetric tables.

Methods and Costs of Producing Crude Petroleum in California (73097). Thomas Cox. 3000 w. W E—Sept., 1916. Tables and charts showing costs of production using different methods of pumping.

Petroleum and Natural Gas in the South as Chemical Resources (73140 A). John D. Northrup. 4000 w. M Rd—Sept. 14, 1916. Reviews recent processes for the better utilization of these products, and the possibilities in the South for development.

Aclaraciones Sobre la Medicion del Petroleo (74212 N). A. Langarica. 5600 w. B P—Sept., 1916. Discussion of methods of determination of volume, specific gravity, etc., of petroleum.

Medicion del Petroleo (74213 N). W. D. Markstrom. 6400 w. B P—Sept., 1916. Comparison of Mexican and U. S. standards of measurement.

Petroleum Industry

Petroleum Producing (70084 A). Alf. G. Heggem. 4000 w. S JI E—May, 1916. Problems of petroleum and natural-gas industries.

Petroleum Measurement

De la medición y calculo del petroleo (67752 N). Leopoldo Vázquez. 3000 w. Bol de Petro—Jan., 1916. Questions of temperature, specific gravity, etc., in measuring petroleum.

Petroleum Production

Petroleum Production Large (67512 A). 2500 w. S JI E—Jan., 1916. Output for 1915 estimated at over 290,000,000 bbls.

Petroleum in 1914 (67472 N). John D. Northrop. 200 pp. U S G S, II: 34—

Consult Classification of the Index. See page 7.

Petroleum Refining

Jan. 12, 1916. Review of developments in industry.

Petroleum Refining

Some of the Interesting Engineering Problems Being Solved at the Atlantic Refining Company's Philadelphia Plant (73890 A). J. D. Gill. Ills. 3500 w. E C P, Pro—Oct., 1916. Plant and features of the oil refining business.

Petroleum Reserves

Nava. Petroleum Reserves No. 1 and No. 2 (68093 B). J. O. Richardson. 12500 w. U S N I, Pro—Jan.-Feb., 1916. Provision to meet future needs.

Petroleum Resources

The Petroleum Resources of the United States (68681 B). Ralph Arnold. 18 pp. E G—Dec., 1915. Revision of figures by Day.

Petroleum Tables

United States Standard Tables for Petroleum Oils (68727 N). 62 pp. U S B S, Circ. 57—Jan. 29, 1916. Expansion tables based on experiments.

Philippines

On the Occurrence of Petroleum in the Province of Cebu (65837 N). Wallace E. Pratt. Ills. 1800 w. Philippine Jour of Sci—July, 1915. Quality of oil obtained and locations known.

Petroleum and Residual Bitumens in Leyte (65836 N). Wallace E. Pratt. Ills. 38 pp. Philippine Jour of Sci—July, 1915. Occurrence, character, and suggestions for exploration.

Pipe Lines

See same heading under **MECHANICAL ENGINEERING, Transporting and Conveying.**

Pumping

Pumping California Crude Oil (66140). C. P. Bowie. Ills. 3600 w. E N—Dec. 2, 1915. Practice.

Refineries

Refineria de petroleo en Minatitlan, Ver. (69613 N). German Garcia Lozano. Ills. 52 pp. B P—March, 1916. Complete description of refining plant of Aguila company in state of Vera Cruz, Mexico.

Refining

European Refining Methods (66404 A). Leopold Seelenfried. Address before Am. Petroleum Soc. 1500 w. W E—Dec., 1915. Austro-Hungary and Rumania.

The Cracking and Distillation of Petroleum Under Pressure (66518 B). Benjamin T. Brooks. 5000 w. F I—Dec., 1915. Many processes patented; increasing the supply of motor fuel.

Equilibrium Relations Among Aromatic Hydrocarbons Produced by Cracking

OIL AND GAS**United States**

Petroleum (67024 N). W. F. Rittman and T. J. Twomey. Ills. 3000 w. J I E C—Jan., 1916. Conclusions from experiments.

The Effect of Temperature on the Formation of Olefins from Petroleum at Atmospheric Pressure (68458). Gustav Egloff and Thomas J. Twomey. 3500 w. M & C E—March 1, 1916. Investigation of cracking.

Manufacture of Gasoline and Benzene-Toluene from Petroleum and Other Hydrocarbons (69035 N). W. F. Rittman, C. B. Dutton, and E. W. Dean. Ills. 255 pp. U S B M—Bul 114. Development of processes; bibliography.

Reservoirs

Concrete-Lined Oil-Storage Reservoirs in California: Construction Methods and Cost Data (66021 D). 500 w. Am Soc Civ Engrs, Pro—Nov., 1915. Discussion of E. D. Cole's paper.

Shale Oil

The Oil-Shale Industry (67444 N). Lionel C. Ball. 12500 w. Q G M JI—Dec. 15, 1916. Introduction to report; nature, distribution and treatment.

South America

See *Coal and Coke*.

Tennessee

Oil and Gas Conditions in the Central Basin of Tennessee (67029 N). A. H. Purdue. Ills. 15 pp. R T—Jan., 1916. Topography, geology, details of operations.

Oil and Gas Conditions in the Reelfoot Lake District of Tennessee (67030 N). A. H. Purdue. Ills. 20 pp. R T—Jan., 1916. Topography, geology, probabilities.

Structure of the Southern Part of Cumberland County, Tennessee, in Relation to the Possible Occurrence of Oil and Gas (69687 N). Chas. Butts. Ills. 4 pp. Maps. R T—April, 1916. General.

Texas

Natural Gas Resources of Parts of North Texas (67382 N). Articles by Eugene Wesley Shaw, George Charlton Watson, and Carroll H. Wegemann. Maps. 120 pp. U S G S—Bul. 629. Reports of investigations.

The Caddo Oil and Gas Field, Louisiana and Texas (70430 A). George Charlton Matson. Ills. 55 pp. U S G S—Bul. 619. History, geology, occurrences, and theories.

United States

The Petroleum Industry in the United States (67888 A). 2500 w. M & E W—Feb. 5, 1916. Production, prices, reports of fields.

Consult Classification of the Index. See page 7.

Uralsk

Uralsk

The Uralsk Province and Its Oilfields (67652 A). F. A. Holiday. Extract from paper read before Inst. of Petroleum Tech. 8500 w. R S A JI—Jan. 14, 1916. General description.

Valuation

Principles of Natural-Gas Leasehold Valuation (69484 D). Samuel S. Wyer. 5500 w. A I M E, Bul—April, 1916. Problems.

Valuation of Oil Properties (70665). Dorsey Hager. 1200 w. E & M J—May 27, 1916. Analysis of factors. Illustrated by examples.

Washington

The Possible Occurrence of Oil and Gas Fields in Washington (66416 D). 1200 w. A I M E, Bul—Dec., 1915. Discussion of Charles E. Weaver's paper.

Wastes

Underground Wastes in Oil and Gas Fields and Methods of Prevention (73719). William F. McMurray and James O. Lewis. Ills. 25 pp. U S B M Tech paper 130. Prevention of conditions that will reduce the recovery.

Water Protection

Protecting California Oil Fields from Damage by Infiltrating Water (66408 D).

ORE DRESSING

Colloids

R. P. McLaughlin. Also discussion. Ills. 6500 w. A I M E, Bul—Dec., 1915. Outlines the problem.

Weight

Consideraciones sobre la determinacion del peso del petroleo (70188 N). A. Langarica. 9 pp. B P—April, 1916. Formulas and methods of determining weight of petroleum.

Wells

The Control of Petroleum and Natural Gas Wells (67436 D). Alfred G. Heggem. Ills. 3000 w. A I M E, Bul—Jan., 1916. Methods recently introduced to safeguard lives and property.

West Virginia

The Possibility of Deep Sand Oil and Gas in the Appalachian Geo-syncline of West Virginia (73276 D). David B. Reger. Maps. 5500 w. A I M E, Bul—Sept., 1916. The geology, deep well history, and suggestions for drilling.

World Production

Le Petrole et la Guerre (65444 B). A. Guiselin. 21 pp. Soc Ing Civ Fr, Prover—Sept. 24, 1915. Relation of oil production to the current war.

Wyoming

Oil and Gas Near Basin, Big Horn County, Wyoming (67539 N). Charles T. Lupton. Maps. 34 pp. U S G S, Bul 621-L—Jan. 21, 1916. Data and map.

ORE DRESSING

Arizona

Plant Construction of the New Cornelia Copper Co., Arizona (71831). W. A. Scott. Ills. 2000 w. M & E W—July 15, 1916. Details of recently constructed plant at Ajo, Ariz.

Blende

The Roasting of Blende (70961). Maurice de Lummen. 4500 w. E & M J—June 10, 1916. Behavior of constituents toward roasting and effect on sulphur elimination.

Braden

The Concentrator of the Braden Copper Company (65470 N). Ills. 2000 w. T T—Oct., 1915. General description.

Chlorination

The Dry Chlorination of Complex Ores (70667). S. A. Ironides. Ills. 4000 w. M & S P—May 27, 1916. Details of this process.

Classifier

A Combined Hydraulic and Mechanical Classifier (69482 D). M. G. F. Sohnlein. Ills. 1500 w. A I M E, Bul—April, 1916. Details.

Clay

Clay: Its Relation to Ore Dressing and Cyaniding Operations (66698 N). A. W. Allen. 6000 w. I M M, Bul 135—Dec. 9, 1915. Colloidal compared with non-colloidal.

Coeur d'Alenes

Metallurgy in the Coeur d'Alenes (65868). Herbert A. Megraw. Ills. 3500 w. Eng & Min Jour—Nov. 20, 1915. The ores of this Idaho district are a complex mixture of argentiferous lead and zinc. Flotation of value.

Colloids

Colloids and Colloidal Slimes (67860). E. E. Free. 5000 w. E & M J—Feb. 5, 1916. New conceptions to fit observed conditions.

Sedimentation and Flocculation (68566). E. E. Free. Ills. 3000 w. E & M J—March 4, 1916. Second article of series.

Sedimentation and Flocculation (68974). E. E. Free. 4000 w. E & M J—March 18, 1916. Third article of series.

Consult Classification of the Index. See page 7.

Concentrates

ORE DRESSING

Flotation

Rate of Slimes Settling (69569). E. E. Free. 5500 w. E & M J—April 15, 1916. Fourth of series.

Properties of Slime Cakes (71135). E. E. Free. 2500 w. E & M J—June 17, 1916. Serial. 1st part. Eighth of a series of articles dealing with colloids in ore dressing. Theories of plasticity are discussed.

Concentrates

Possibilities in the Wet Treatment of Copper Concentrates (73268 D). Lawrence Addicks. Ills. 1500 w. A I M E, Bul—Sept., 1916. Results of experiments.

Concentration

Recent Improvements in Concentration at the Washoe Reduction Works, Anaconda, Montana (71034 N). E. P. Mathewson. Ills. 1000 w. C M I, Bul—June, 1916. Changes for treating by flotation process.

Tungsten-Molybdenum Ore Concentration (71817). From article by A. J. Robertson. 2000 w. E & M J—July 15, 1916. Recourse was had to flotation.

Copper Mattes

An Investigation into the Flowing Temperatures of Copper Mattes and of Copper-Nickel Mattes (70894 D). G. A. Guess and F. E. Lathe. Ills. 1000 w. A I M E, Bul—June, 1916. Results of experiments.

Copper Smelting

Notes on Copper Smelting at the United Verde Copper Company (72974 A). Ills. 1200 w. M & C E—Sept. 1, 1916. New smelting plant and methods at Clarkdale, Ariz.

Cornish Ores

The Economic Extraction of Tin and Tungsten from Cornish Ores (69706 A). 2500 w. Enr—March 31, 1916. Research work to be undertaken.

Crushing

Brechanlagen für Hochofenschlacke (65459 B). A. Mann. Ills. 2000 w. St u E—Oct. 21, 1915. New plant for crushing blast-furnace slag.

Kick vs. Rittinger (67964 D). 2500 w. A I M E, Bul—Feb., 1916. Discussion of A. O. Gates' paper.

Crushing and Grinding Machinery (71548). 5500 w. E & M J—July 1, 1916. Types are discussed.

Cyanidation

The Discovery of Cyanidation (70989). John S. McArthur. 6000 w. M & S P—June 10, 1916. History of cyanide work.

Continuous Counter Current Agitation and Decantation (74185). C. F. Spaulding. Ills. 1600 w. M & E W—Oct. 28, 1916. Notes from the writer's experience.

Cyanide

Atmospheric Decomposition of Cyanide Solutions (73278). G. H. Clevenger and Harry Morgan. 6500 w. M & S P—Sept. 16, 1916. Reports results of tests.

Cyaniding

Cyaniding Clayey Ore at the Buckhorn Gold Mine (73267 D). Paul R. Cook. Ills. 1500 w. A I M E, Bul—Sept., 1916. Difficulties and how met.

Some Notes on the Effect of Lead Salts and of Varying Degree of Alkalinity on the Solvent Power of Cyanide Solution for Gold (73552 N). H. R. Edmands. 1200 w. C M W A, JI—June, 1916. Corrections and descriptions of methods employed for determinations given in an article in April issue.

Development

The Evolution of Ore-Dressing Methods (66780). Robert H. Richards. Read at Int. Engng. Cong., San Francisco. 3000 w. C M JI—Dec. 15, 1915. Reviews development and improvements in the art.

Dust Losses

Determination of Dust Losses at the Copper Queen Reduction Works (70896 D). J. Moore Samuel. Ills. 4500 w. A I M E, Bul—June, 1916. Methods of measurement, and instruments used.

Electrostatic Separation

Electro-Static Separation of Pyritic Zinc Ores (66705). J. H. Lewis. Ills. 1700 w. M & S P—Dec. 18, 1915. Principal features of five distinct types of magnetic separators.

Flotation

Flotation of Joplin-Galena Slimes (65740 A). George Belchic and Glenn L. Allen. 700 w. Met & Chem Engng—Nov. 15, 1915. Flotation tests.

Cyanide Treatment of Flotation Concentrate (65938). Charles Butters and J. E. Clennell. 5000 w. Min & Sci Pr—Nov. 20, 1915. Recent tests on gold-silver ore of the San Sebastian mine, Salvador.

A new Flotation Experiment (66035). 300 w. Eng & Min Jour—Nov. 27, 1915. Experiment plant at Ohio Copper; Field process; leaching and floating.

Flotation v. Wet Concentration (66427 N). 1800 w. M & E R—Nov. 5, 1915. General discussion.

The Electrical Theory of Flotation (66090). Thomas M. Bains, Jr. 2500 w. M & S P—Nov. 27, 1915. Interpretation, involving electrostatics.

Notes on Flotation (66409 D). J. M. Callow. Ills. 5000 w. A I M E Bul—Dec., 1915. History. Callow process; theory.

Consult Classification of the Index. See page 7.

Flotation

Effects of Soluble Components of Ore on Flotation (66706). 1500 w. M & S P—Dec. 18, 1915. Fouling agents; methods for overcoming.

Flotation—A Paradox (66816 A). Dudley H. Norris. 3500 w. M & S P—Dec. 25, 1915. Patent questions.

The Status of Flotation Litigation (66702). 1200 w. M & S P—Dec. 18, 1915. Editorial explanation.

Flotation—Its Progress and Its Effect Upon Mill Design (66866). C. A. Tupper. Ills. 5000 w. M & E W—Jan. 1, 1916. Present situation; tendencies.

Disposal of Flotation Residue (66495). W. Shellshear. Ills. 2500 w. M & S P—Dec. 11, 1915. Abstract from *Min. & Eng. Rev.* Methods in Australia.

Flotation at the Consolidated Arizona Smelting Co., Humboldt, Arizona (66084). 2500 w. M & C E—Dec. 1, 1915. Methods and costs.

Flotation at Globe-Miami, Ariz. (66607). 1500 w. E & M J—Dec. 18, 1915. Inspiration and other plants.

Flotation of Silver-Lead Mineral at a New South Wales Mine (66380). H. Hardy Smith. Ills. 3000 w. E & M J—Dec. 11, 1915. Silver Peak mill of Yer-randeria district; operating details.

Flotation at Gold Hunter Mill (66770). Ills. 900 w. E & M J—Dec. 25, 1915. Practice in Coeur d'Alenes.

Flotation Plant of the Utah Leasing Company (66497). Herbert Salinger. 700 w. M & S P—Dec. 11, 1915. Plant at Newhouse, Utah.

Progress of Flotation in 1915 (67163). Herbert A. Megraw. Map. 2500 w. E & M J—Jan. 8, 1916. Important facts, applications of process, theory.

Flotations in 1915 (66937). 1500 w. M & C E—Jan. 1, 1916. Editorial review.

New Ideas About Flotation (66913). Ills. 600 w. E & M J—Jan. 1, 1916. New machines.

Carrie Jane Billings Everson (67287). Ills. 4500 w. E & M J—Jan. 15, 1916. Information concerning discovery of process.

Pine Oil for Flotation (66912). C. F. Sherwood. 500 w. E & M J—Jan. 1, 1916. Report of test, showing its influence.

Testing Ores for the Flotation Process (66969). O. C. Ralston and Glenn L. Allen. Ills. 3500 w. M & S P—Jan. 1, 1916. Serial, 1st part. Machines and processes in use.

The Electrical Theory of Flotation (67412). David Cole. 2000 w. M & S P—Jan. 15, 1916. Letter referring to Badins' article.

ORE DRESSING

Flotation

Why Is Flotation? (66968). George Huston. 1500 w. M & S P—Jan. 1, 1916. Discussion of theory.

Flotation at Broken Hill, N. S. W. (67076). 1200 w. E & M J—Jan. 29, 1916. System at Central mine.

Flotation in Cuba (67555). Ills. 600 w. M & S P—Jan. 22, 1916. Methods and results at Cobre mine near Santiago.

Flotation Replaces Cyanide (67290). R. W. Smith. Ills. 2500 w. E & M J—Jan. 15, 1916. Details of installation at Freeland, near Idaho Springs, Colo.

Oil Flotation and Copper Leaching at the Washoe Smelter (67544). Freeman D. Lohr. 2000 w. W E—Jan., 1916. New equipment recently installed, with theoretical explanations of flotation.

A Glossary of Flotation (68131). 900 w. M & S P—Feb. 12, 1916. Terms defined.

Flotation Principles (68284). C. Terry Durell. Also editorial. 8500 w. M & S P—Feb. 19, 1916. Experimental investigation.

Molecular Forces in Flotation (68133). Dudley H. Norris. 4500 w. M & S P—Feb. 12, 1916. Serial, 1st part. General discussion.

Oils and Other Reagents in Flotation (67643). Robert J. Anderson. 2000 w. M & C E—Feb. 1, 1916. Characteristics.

Universal Flotation Theory (68297 A). C. Terry Durell. 6500 w. Colo Sch of Mines Mag—Feb., 1916. Different processes.

List of References on Concentrating Ores by Flotation (68841 N). Jesse Cunningham. 104 pp. U M S M M, Bul—Jan., 1916. Unusually complete bibliography.

Flotation Symposium at Ottawa (68787). 9500 w. M & C E—March 15, 1916. Papers and discussion at meeting of Can. Min. Inst.

The Flotation Process (68638 N). T. A. Rickard. Ills. 13800 w. C M I, Bul—March, 1916. General treatment.

The Psychology of Flotation (68635). 1000 w. M & S P—March 4, 1916. Editorial review of patents and processes.

The Electro-Statics of Flotation (68901). F. A. Fahrenwald. Ills. 3500 w. M & S P—March 11, 1916. Objections.

On the Science of a Froth (68457). Will H. Coghill. 2500 w. M & S P—Feb. 28, 1916. Theories.

Interfacial Tension in Flotation (69114). H. J. Stander. 2000 w. E & M J—March 25, 1916. Theories.

Flotation Concentration at Anaconda, Mont. (68527 D). Frederick Laist, and Albert E. Wiggin. Ills. 11000 w. A I

Consult Classification of the Index. See page 7.

Flotation

ORE DRESSING

Flotation

M E, Bul—March, 1916. Unusually complete description.

Recent Progress in Flotation (70415 B). Robert J. Anderson. 15 pp. F I, JI—May, 1916. General review.

How Flotation Works (70372). G. D. Van Arsdale. Ills. 5500 w. E & M J—May 13, 1916. Intelligible theories.

Notes on Flotation (70300 D). 1600 w. A I M E, Bul—May, 1916. Discussion of Callow's paper.

Flotation Principles (69995). Oliver C. Ralston. 2000 w. M & S P—April 29, 1916. Further discussion of Durell's paper.

Flotation and Cyanidation (70386). 4500 w. M & C E—May 15, 1916. Symposium on probable future relative status.

Cyanidation of Flotation Concentrate (70229). Editorial letter from Paul W. Avery. 700 w. M & S P—May 6, 1916.

Direct Drive for Flotation Machines (70510). Girard B. Rosenblatt. Ills. 800 w. M & E W—May 20, 1916.

Soap as a Frothing Agent in Flotation (70394). M. H. Thornberry. 1200 w. M & S P—May 13, 1916. Results of tests.

Breaking Down Froth in Flotation Work (70511). Ills. 1000 w. M & E W—May 20, 1916. Process invented by A. W. Thompson and David Cole.

Flotation Practice in Missouri (69997). L. A. Delano. 1200 w. M & S P—April 29, 1916. Outline of work accomplished.

Oils for Flotation (69857). Charles Y. Clayton and C. E. Peterson. 1500 w. M & S P—April 22, 1916. Experimental study of properties.

The Metallurgical Disposal of Flotation Concentrates (69279). R. J. Anderson. 3000 w. M & C E—April 1, 1916. Handling and smelting.

Machinery for Cyaniding Flotation Concentrate (69406). A. E. Drucker. 2000 w. M & S P—April 8, 1916. Method.

Concentration of Cobalt Silver Ores by Oil Flotation (71257). A. A. Cole. 500 w. C M JI—June 15, 1916. Extract from report of T. & N. O. Ry. Commission.

Difficulties Encountered in Making Oil Flotation Tests (71148). James McClave. 600 w. M & E W—June 17, 1916. Importance of finding the right oil for a given ore.

Flotation Process at the Standard Mill, Silverton, B. C. (71147). James G. Parmalee. Ills. 1000 w. M & E W—June 17, 1916. Geology, plant in operation, and the Wyman pneumatic flotation machine.

Flotation Versus Cyanidation (71097). Jackson A. Pearce. 2500 w. M & C E—June 15, 1916. Parallel tests.

Ore Flotation (70733). Wilder D. Bancroft. Read at joint meeting in N. Y. 5000 w. M & C E—June 1, 1916. Explanation of selective absorption, with experiments.

Statement on Flotation Oils—Market Situation Regarding Flotation Oils (70975). O. C. Ralston. 1200 w. M & E W—June 10, 1916. Cost; oils adapted to certain ores.

The Flotation Process at Goldfield, Nevada (70788). A. H. Martin. 1200 w. M & E W—June 3, 1916. The Callow method is used.

Apparatus Used in Flotation (71538). Herbert A. Megraw. Ills. 3000 w. E & M J—July 1, 1916. Details of three classes of machines used.

Bunker Hill and Sullivan Milling Data (71544). R. S. Handy. Ills. 1200 w. E & M J—July 1, 1916. Scheme of operation and cost.

Flotation in Joplin District (71546). Lucius L. Wittich. 700 w. E & M J—July 1, 1916. Only one successful plant.

Concentration and Flotation of Lead Ores in Southeast Missouri (71807). 3000 w. M & C E—July 15, 1916.

Flotation of Flour Gold (71541). Ralph W. Smith. Flow sheet. 1800 w. E & M J—July 1, 1916. How good results were obtained.

Froths Formed by Flotation Oils (71543). William A. Mueller. Ills. 5500 w. E & M J—July 1, 1916. Qualities of different oils.

The Flotation of Oxidized Ores (72131 N). O. C. Ralston and Glen L. Allen. 12 pp. U S B M—July, 1916. Results of experimental work.

Metallurgical Disposal of Flotation Concentrates (71676). R. J. Anderson. 3000 w. M & E W—July 8, 1916. Handling and smelting of concentrates.

Some Notes on Flotation (71542). R. C. Canby. 2500 w. E & M J—July 1, 1916. Experiments on Teziutlan ores and factors influencing practice.

The Flotation of Minerals (71753 D). Robert J. Anderson, with Bibliography. 17 pp. A I M E, Bul—July, 1916. Theory, and discussion of certain factors.

The Theory of Flotation (71563). H. Hardy Smith. Ills. 3000 w. M & S P—July 1, 1916. A contaminant is necessary.

Use of Oils in Flotation (71547). Herbert A. Megraw. 8500 w. E & M J—July 1, 1916. Purpose of oil, functions, tests, etc.

An Explanation of the Flotation Process (72256 D). Arthur F. Taggart and Frederick E. Beach. Ills. 13 pp. A I M E, Bul—Aug., 1916. Theory in explanation.

Flotation

ORE DRESSING

Furnaces

An Improved Pneumatic Flotation Machine (72341). James M. Hyde. Ills. 2200 w. M & S P—Aug. 5, 1916. Description.

Flotation Experiments on a Joplin Tailing (72211). W. A. Whitaker, George Belchic, Roy Neal, and H. L. Van Velzer, with discussion. 3000 w. M & C E—Aug. 1, 1916. Experimental study and results.

Some Miscellaneous Wood Oils for Flotation (72257 D). R. C. Palmer, G. L. Allen, and O. C. Ralston. 10 pp. A I M E, Bul—Aug., 1916. Results of tests of oil samples.

Sulphidizing and Flotation of Oxidized Ores (72388). O. C. Ralston and Glen L. Allen. 2500 w. C M JI—Aug. 1, 1916. Investigations by the U. S. Bureau of Mines.

The Function of Oil and Acid in Flotation (72565). H. J. Stander. 3300 w. M & E W—Aug. 19, 1916. Experimental investigation.

A Few Notes on Callow Flotation (73037). A. G. Morrison. 1200 w. C M JI—Sept. 1, 1916. Experience in the flotation of chalcopyrite.

Agreement Between Minerals Separation and the Inspiration-Anaconda Companies (73279). Also editorial. 3000 w. M & S P—Sept. 16, 1916. Verbatim agreement, with editorial comment.

A New Flotation Oil (73273 D). Maxwell Adams. 700 w. A I M E, Bul—Sept., 1916. Concerning sage-brush oil for this process.

A New Source of Flotative Agents (73274 D). G. H. Clevenger. Ills. 2800 w. A I M E, Bul—Sept., 1916. Investigations of sage brush, reporting tests.

A Source of Flotative Agents (72968). G. H. Clevenger. In Bul. A. I. M. E., with additions. Ills. 3500 w. E & M J—Sept. 2, 1916. Possibility of producing oils from western vegetation.

Flotation Tribulations (73280). Jackson A. Pearce. 3000 w. M & S P—Sept. 16, 1916. Difficulties and some causes of the troubles.

History of the Flotation Process at Inspiration (73272 D). Rudolf Gahl. Ills. 55 pp. A I M E, Bul—Sept., 1916. Tests, operation, results, prospects, etc.

Molecular Forces and Flotation (72959). Will H. Coghill. Ills. 8000 w. M & S P—Sept. 2, 1916. Application of physics to the flotation process.

Ore Concentration by Flotation (73102 A). 3500 w. Eng—Aug. 25, 1916. Processes in use; theory and general features.

Surface Tension of Oil-Water Emulsions—A Flotation Theory (73243). George Belchic and Roy O. Neal. 1500 w. M & E W—Sept. 16, 1916. Surface tension measurements and discussion of results.

The Advent of Flotation in the Clifton-Morenci District, Arizona (73271 D). David Cole. Ills. 15 pp. A I M E, Bul—Sept., 1916. Results with C-B and Callow flotation machines, with details of equipment.

The Invention, Development, and Introduction of the Flotation Process (73454). A. Stanley Elmore. Also editorial. 8000 w. M & S P—Sept. 23, 1916. Account of early work in flotation and later developments.

Experiments from the Flotation Laboratory (73745 N). C. Y. Clayton. Ills. 85 pp. Mo Sch of Mines, Bul—Aug., 1916. Results of investigations.

Flotation at Mount Morgan (74051). Excerpt from article by W. Shellshear, in *Pro Aust. Inst. of Min. Engrs.* 2500 w. E & M J—Oct. 12, 1916. Experimental results.

Flotation Concentration of Carbonate Ores (73798). Joseph T. Terry, Jr. 700 w. M & S P—Oct. 7, 1916. Notes on successful concentration.

History of the Flotation Process at Inspiration (73744 D). 2500 w. A I M E Bul—Oct., 1916. Discussion of Rudolf Gahl's paper.

Notes on Flotation in the Southwest (73773). L. C. Penhoel. Ills. 1000 w. M & E W—Oct. 7, 1916. Working conditions for flotation plants.

The Separation of Galena from Blende by the Horwood Process of Flotation (73797). Allen D. Rain. 1500 w. M & S P—Oct. 7, 1916. Abstract from *Teniente Topics*. Methods.

The Wilmington Decision on Flotation (73933). 5500 w. M & S P—Oct. 14, 1916. Serial, 1st part. First part of the decision in the suit of Minerals Separation v. Miami Copper Co.

Wilmington Decision in Miami Flotation Suit (73948 A). 1300 w. M & C E—Oct. 15, 1916. Nearly full text of Judge Bradford's decision, with editorial comment.

Furnaces

Blast vs. Reverberatory Furnace (73831). B. Magnus. 700 w. E & M J—Oct. 7, 1916. Consideration of advantages, favors the blast furnace, for the treatment of the copper-gold ore of Australia.

Wedge Roasting Furnaces for Lead Matte and Zinc Ores (73823). Ills.

Glass Surfaces

1500 w. E & M J—Oct. 7, 1916. Information regarding these applications.

Glass Surfaces

Glass Surfaces in Concentration (68842 A). W. H. Trewartha-James. Ills. 6 pp. M Mg—Feb., 1916. Paper and discussion on experiments in Cornwall.

Glass-Top Concentrating Tables (68890 A). 3 pp. M Mg—Mar., 1916. Discussion of Trewartha-James' paper.

Grinding

Chilean Mills Versus Stamps (66911). Alexander McClaren. 2000 w. E & M J—Jan. 1, 1916. Stamps used with high-speed and with slow-speed chilean mills.

Fine Grinding: Stamps and Ball-Mills (70392). Henry Hanson. 3000 w. M & S P—May 13, 1916. Arguments against the stamp.

A Comparative Test of the Marathon, Chilean and Hardinge Mills (72252 D). F. C. Blickensderfer. Ills. 15 pp. A I M E, Bul—Aug., 1916. Test of relative grinding efficiencies.

Iron Ore

See Ore Washing under *Iron and Steel*.

Leaching

Leaching Tests at New Cornelia (73270 D). H. W. Morse and H. A. Tobelmann. 18 pp. A I M E, Bul—Sept., 1916. Data on results during experimental work.

The 2000-Ton Leaching Plant at Anaconda (72250 D). Frederick Laist, and Harold W. Aldrich. Ills. 13 pp. A I M E, Bul—Aug., 1916. Description, details of operation, results.

Magnetic Separation

Magnetic Separation in Sardinia (66144). Charles W. Wright. Ills. 1200 w. E & M J—Dec. 4, 1915. Ulrich machines used with successful results.

Manganese Silver

The Manganese Silver Problem (74079 N). Walter Neal. 7500 w. C M M S S A, JI—Aug., 1916. Investigation of processes in the treatment of such ores.

Milling

The Stoddard Mill—A Copper Concentrator (74087). B. B. Clyne. Ills. 1200 w. M & S P—Oct. 21, 1916. Mill in Arizona to treat 100 tons daily of chalcoppyrite ore.

Mill Sites

Choosing the Mill Site (71537). Edward S. Wiard. Ills. 2500 w. E & M J—July 1, 1916. Things to be considered.

Molybdenite

The Concentration of Canadian Molybdenite Ores (68639 N). Henry E. Wood. Ills. 4500 w. C M I, Bul—March, 1916. Methods and results.

ORE DRESSING**Slocan****Nevada Mill**

Construction and Operation of the Nevada Packard Mill (73087). Herbert G. Thomson. Ills. 4000 w. M & S P—Sept. 9, 1916.

North Star

The Central Mill of the North Star Mines Co. (66945). Leroy A. Palmer. Ills. 3000 w. M & C E—Jan. 1, 1916. Using amalgamation, concentration, and cyanidation.

Ore-Sampling

Ore-Sampling Conditions in the West (73566). T. R. Woodbridge. Ills. 90 pp. U S B M—Tech. paper 86. Facts regarding present methods of ore-sampling.

Ore-Treatment

The Selection of a Method of Ore-Treatment (73305 A). George J. Young. 3500 w. M & C E—Sept. 15, 1916. Present methods; determining the physical and chemical nature of the ore.

Precipitation

Electrolytic Precipitation from Cyanide Solutions (73636). G. H. Clevenger. 2500 w. E & M J—Sept. 30, 1916. Essential features. Variations of methods and materials.

Pulp Sampler

Discussion on Taylor's Pulp Sampler (68687 N). W. H. Trewartha-James, and others. Ills. 4000 w. I M M Bul 137—Feb. 17, 1916. Description.

Roasting

The Roasting of Blendes (74048). Maurice V. M. de Lummen. 1500 w. E & M J—Oct. 21, 1916. Hegeler, Spirlet, and Delplace systems, applicable to Australian concentrates.

Sampling Plant

See Sampling under *Mine Operation*.

San Juan

Recent Milling Practice in San Juan County, Colorado (67300). Etienne A. Ritter. Ills. 4000 w. M & E W—Jan. 15, 1916. Operations are either concentration and flotation, or concentration and magnetic separation of zinc and copper.

Screening

Mass Screening with Flat Screens (69280). Edward S. Wiard. Ills. 5500 w. M & C E—April 1, 1916. Mechanical methods.

Screens

The Control of Ore Slimes (69970). Oliver C. Ralston. 7000 w. E & M J—April 29, 1916. Serial, 1st part. Theories.

See Sieves under *MECHANICAL ENGINEERING, Measurement*.

Slocan

Operations in the Slocan District (68700). Douglass Lay. Ills. Flow

Consult Classification of the Index. See page 7.

Smelters

sheet. 4000 w. E & M. J—March 11 1916. Zinc and silver.

Smelters

International Smelting Company Miami Plant (70827). Ills. 300 w. M & S P—June 3, 1916. Flow sheet and details of operation.

Custom Smelters and Small Mines (72021). J. M. Turnbull. 3000 w. M & S P—July 22, 1916. Smelter profits, treatment charges, etc.

Relations Between Custom Smelters and Small Mine Owners (71675). J. M. Turnbull. 3000 w. M & E W—July 8, 1916. Excerpts from an address before Vancouver Chamber of Mines.

Smelting

The Electro-Thermic Smelting of Iron Ores in Scandinavia (72014 A). Ills. 3000 w. Enr—July 7, 1916. Information from report of the Can. Dept. of Mines.

Features of the New Copper Smelting Plants in Arizona (72249 D). A. G. McGregor. Ills. 23 pp. A I M E, Bul—Aug., 1916. New problems and new features in plant design and equipment.

Smelting at the Arizona Copper Co.'s Works (73269 D). F. N. Flynn. Ills. 13 pp. A I M E, Bul—Sept., 1916. Flow sheet and details of practice.

Blast-Furnace Slag Shells (73824). Curtis Pigott. 1000 w. E & M J—Oct. 7, 1916. Abandonment of their use at many places.

Changes in Smelting Practice of Anaconda Copper Mining Co (73826). Frederick Laist. Ills. 2200 w. E & M J—Oct. 7, 1916. Recent changes and improved results.

Copper Smelting at Naltagua in Central Chile (74172). Mark R. Lamb. Ills. 700 w. E & M J—Oct. 28, 1916. Account of conditions and the proposed substitution of reverberatory smelting for blast-furnace smelting.

Lead-Smelting Practice in the United States (73832). Arthur S. Dwight. Ills. 5500 w. E & M J—Oct. 7, 1916. Advances principally in refinements and handling facilities.

The Smelting of Mercury Ores (73825). W. H. Landers. Ills. 4000 w. E & M J—Oct. 7, 1916. New methods being devised; field for a wet process.

Van Buren Smelting Plant (73829). F. W. Bocking. Ills. 1000 w. E & M J—Oct. 7, 1916. Equipment for handling zinc ores.

Stamping

Pressing and Stamping Metals (73576 A). Oberlin Smith. Ills. 1800 w. E M

ORE DRESSING

—Oct., 1916. Second article of a series dealing with heavy presses.

Stamp Mills

Replacing Mortar Blocks (72714). Charles Labbe. Ills. 1500 w. E & M J—Aug. 26, 1916. Methods.

Stamps

Stamps and Competitive Machinery (67974). H. C. Cutler. 3000 w. M & S P—Feb. 5, 1916. Arguments for and against.

Steam Stamps

Don Luis Charmes's Tremain Steam Stamp (71540). M. R. Lamb. Ills. 2500 w. E & M J—July 1, 1916. Troubles in connection with mining machinery.

Tin

Notes on the Chemical Assay of Tin Ores (73064). A. M. Matheson. 1800 w. M & E W—Sept. 9, 1916. Difference between fire and chemical assays carried out on highly pyritic tin ore.

Tube Mills

Installation of Tube Mills (69972). Charles Labbe. Ills. 2500 w. E & M J—April 29, 1916. Practical suggestions.

Tungsten

Recent Practice in Concentrating Colorado Tungsten Ores (68783). H. C. Parmelee. Ills. 1800 w. M & C E—March 15, 1916. New mill of Boulder Tungsten Production Co.

The Milling of Tungsten Ores (69825). James F. Magee. Ills. 1000 w. E & M J—April 22, 1916. In Colorado.

On Concentration Tests of a Tungsten-Molybdenum Ore from Callie Soak, Poona, Murchison Goldfields (69680 N). Alex J. Robertson. Ills. 9 pp. Geol Sur W Aust—Bul 64, Rpt 56.

Concentrating Tungsten Ores, Boulder County, Colorado (74069). W. A. Scott. Ills. 2500 w. M & E W—Oct. 21, 1916. Reviews milling methods and equipment at the different plants.

Vanadium

Experiments on the Separation of Vanadium from Crude Sodium Uranate (66941). Howard H. Barker and Herman Schlundt. 5500 w. M & C E—Jan. 1, 1916. Experiments and results.

Vanadium Ores

Concentration and Smelting of Vanadium Ore (73088). R. L. Grider. Ills. 1200 w. M & S P—Sept. 9, 1916. Treatment of the lead vandate ore at Cutter, New Mexico.

Zinc

Concentration of Zinc Ore in Wisconsin (69855). H. P. Wherry. Ills. 3500 w. M & S P—April 22, 1916. Methods at Thompson mine, New Diggings.

Consult Classification of the Index. See page 7.

Alaska**PLACER MINING****Amador County****Alaska**

Gold Mining in the Willow Creek District, Alaska (72213). Stephen R. Capps. 2200 w. U S G S—Bul. 642-F. Supplement of a more complete report.

Arizona

Successful Dry Placer Operations, at Plomosa, Arizona (71551). William L. Plummer. Ills. 1200 w. M & E W—July 1, 1916. Experimental plant.

Aslin

The Solution of Some Hydraulic Mining Problems on Ruby Creek, British Columbia (70295 D). Chester F. Lee and T. M. Daulton. Ills. 1500 w. A I M E, Bul—May, 1916. Difficulties overcome in this northern district.

British Columbia

Acquiring Placer-Mining Claims in British Columbia (65561). J. A. MacDonald. Ills. 1500 w. E & M J—Nov. 6, 1915. Details of requirements.

Placer Gold Mining in British Columbia (70949). E. Jacobs. 3000 w. C M J—June 1, 1916. Production, with report by districts.

Dredging

Gold Dredging in 1915 (67164). Robert E. Cranston. 2500 w. E & M J—Jan. 8, 1916. Review of work and conditions.

A California Dredge with Two Tailings Stackers (67505). Lewis H. Eddy. Ills. 2500 w. E & M J—Jan. 22, 1916. A dredge equipped with means for re-soiling the area it dredges.

Jigs on a California Dredge (67073). Lewis H. Eddy. Ills. 1000 w. E & M J—Jan. 29, 1916. Grinding mill and jig system installed on a dredge and successfully used.

Dredging Operations at the Beginning of 1916 (66868). Ills. 6500 w. M & E W—Jan. 1, 1916. Editorial review.

Drift Mining

Winter Mining at Fairbanks (65327). Hubert I. Ellis. Ills. 3500 w. Eng & Min Jour—Oct. 30, 1915. Methods.

Dry Concentrating

Dry Placer Mining on a Large Scale (70685). W. G. Keiser. 1500 w. M & E W—May 27, 1916. Quenner-Stebbins plant, in Arizona.

Mozambique

Dredging in Mozambique (69567). L. C. de la Marliere. Ills. 1200 w. E & M J—April 15, 1916. Low-grade gravels.

Nigeria

A Pioneer Bucket Dredge in Northern Nigeria (68689 N). H. E. Nicholls. Ills. 3000 w. I M M, Bul 137—Feb. 17, 1916. Details of dredge; work; deposits; operated by semi-Diesel engine.

A Pioneer Bucket Dredge in Northern Nigeria (69170 N). 2000 w. I M M, Bul 138—March 16, 1916. Discussion of Nicholls' paper.

Prospecting

Prospecting Gold Gravel with Keystone Drills (66779). From report of J. D. Galloway on conditions in Cariboo division, B. C. 2000 w. C M J—Dec. 15, 1915. Information on operations.

Seward Peninsula

Prospecting Before Dredging on Seward Peninsula, Alaska (69996). Corey C. Brayton. Ills. 5000 w. M & S P—April 29, 1916. Review of methods for testing and of dredge design to meet local conditions.

Sluicing

Sluicing Methods at Fairbanks (66605). Hubert I. Ellis. Ills. 2500 w. E & M J—Dec. 18, 1915. Details.

South Carolina

The Walhalla District, S. C. (68398). Frank P. Peterson and Frank H. Flynn. Ills. 2300 w. E & M J—Feb. 26, 1916. Gold veins and placers indicating economic value.

Yukon

Development of Dredging in Yukon Territory (66769). O. B. Perry. Read before the Can. Min. Inst. Ills. 3500 w. E & M J—Dec. 25, 1915. Problems and their solution.

PRECIOUS METALLURGY**Africa**

The Mines of the Ashanti Goldfields Corporation (70884 A). W. R. Feldtmann. Ills. 8500 w. M Mg—May, 1916. History and details of the most important gold mining district in West Africa.

Alabama

The Gold Log Mine, Talladega County, Alabama (73900). Edson S. Bastin. 1000 w. U S G S, Bul 641-I—Oct. 10,

1916. Information concerning this gold mine.

Alaska

Gold, Silver, and Copper in Alaska in 1915 (73161 N). Alfred H. Brooks. 15 pp. U S G S, I: 8—Aug. 30, 1916. Production, with review by regions.

Amador County

Gold-Milling in Amador, California (68456). Edward B. Durham. Ills. 1500

Consult Classification of the Index. See page 7.

Amalgamation

w. M & S P—Feb. 26, 1916. Various plants.

Amalgamation

Clean-Up Room Practice at the Summer Deep (66297 N). W. H. Jane and E. Davey. 3300 w. C M M S S A—Oct., 1915. Methods.

Assaying

The Distribution of Silver Between Metallic Lead and Litharge-Containing Slags (70734). Boyd Dudley, Jr. Ills. 5800 w. M & C E—June 1, 1916. Serial, 1st part. Errors in crucible assay; equilibrium in crucible fusion; composition of slags, etc.

Extraction of Gold and Silver from Matte by Lead (71096). W. Mostowitsch. Abstract translation from Jour. of Russian Metallurgical Soc. Ills. 1500 w. M & C E—June 15, 1916. Simple method for quantitative determination.

Batopilas

Metallurgy of Native-Silver Ores of Southwestern Chihuahua (68049). W. M. Brodie. Ills. 5000 w. E & M J—Feb. 12, 1916. Read at 2nd Pan.-Am. Sci. Cong. Ancient and modern methods.

Bullion Segregation

Segregation in Gold Bullion (67954 D). James H. Hance. 5500 w. A I M E, Bul—Feb., 1916. Experimental results. Segregation in Gold Bullion (70311 D). 2500 w. A I M E, Bul—May, 1916. Discussion of Hance's paper.

California

The Re-Opening of Old Mines Along the Mother Lode, California (71405). T. A. Rickard. Ills. 3500 w. M & S P—June 24, 1916. Gold mining.

Cobalt

The Metallurgy of Canadian Cobalt Ores (67425). Ralph W. Bridges. 3000 w. C M JI—Jan. 15, 1916. Serial, 1st part. Tables and notes.

Recent Developments in the Cobalt District (71258). Map & Ills. 1600 w. C M JI—June 15, 1916. Reports from mines.

Silver Deposits in the Cobalt District (71256). Ills. 800 w. C M JI—June 15, 1916. Deposits and their discovery and development.

Complex Ores

The Hydrometallurgical Treatment of Complex Gold and Silver Ores (68105). G. H. Clevenger. Read before 2nd Pan.-Am. Cong. 8000 w. M & C E—Feb. 15, 1916. History, operations, examples.

Concentration

Gold-Saving on Dredges (72342). Howard D. Smith. Ills. 1200 w. M & S P—Aug. 5, 1916. Method of concentration that includes jigs and a Hardinge mill.

PRECIOUS METALLURGY**Cyaniding****Cottrell Process**

Treatment of Silver Furnace Fume by the Cottrell Process (66394). Charles H. Aldrich. 2500 w. M & E W—Dec. 11, 1915. Recovery of metal values from gases.

Cyanidation

Discrepancies in Cyanidation (71857). Edmund Shaw. 3000 w. M & S P—July 15, 1916. Causes of difference between theoretical and actual extraction.

Some Notes on the Effect of Lead Salts and of Varying Degree of Alkalinity on the Solvent Power of Cyanide Solution for Gold (71704 N). H. R. Edmands. 3000 w. C M W A—April, 1916.

Cyanide Plants

Building the Tough-Oakes Mill (66003). John A. Baker. Ills. 4000 w. Eng & Min Jour—Nov. 27, 1915. Serial, 1st part. Rapid development at Kirkland Lake, Ont.

Trojan Ore and Milling Practice (65643). Ills. 2500 w. Min & Sci Pr—Nov. 6, 1915. Cyanidation in the Black Hills.

Cyaniding by Continuous Decantation at Two Nevada Silver Mills (69720). Ills. 3000 w. M & C E—April 15, 1916. Pittsburgh Dolores and Rochester mills. Metallurgy at Tough-Oakes Gold Mines, Limited (70213). Charles A. Randall. Ills. 3000 w. C M JI—May 1, 1916. Experiments for deciding on suitable cyanide plant.

Cyanidation at the Comacaran Mine, Salvador (69999). A. B. Peckham. Ills. 2000 w. M & S P—April 29, 1916. Details of system; advantages.

Cyanide Practice

Cyanide Consumption on the Witwatersrand (65769 N). H. A. White. 4800 w. Chem, Met, & Min Soc of S Africa, Jour—Sept., 1915. Experiments made to ascertain possibilities of effecting saving.

The Determination of Mercury in Cyanide Solution and Precipitate (65391). W. J. Sharwood. 1800 w. Min & Sci Pr—Oct. 30, 1915. Details of methods.

The Prevention of Hydrolysis in Cyanide Solutions (65770 N). H. M. Leslie. Also discussion. 8500 w. Chem, Met & Min Soc of S Africa, Jour—Sept., 1915. Experimental study, with results.

The Electrolytic Precipitation of Gold, Silver and Copper from Cyanide Solutions (65523). G. H. Clevenger. Read before Am. Elec-Chem. Soc. Ills. 4000 w. Met & Chem Engng—Nov. 1, 1915. Serial, 1st part. Details of plants.

Cyaniding

Influence of Heat in Cyaniding Gold Ores (66697 N). E. A. Wraight. 2500

Cyaniding

PRECIOUS METALLURGY

Precipitate Refining

w. I M M, Bul. 135—Dec. 9, 1915. Experimental investigations and conclusions.

Precipitation With Zinc - Thread (66494). Jay A. Carpenter. 3000 w. M & S P—Dec. 11, 1915. Advantages.

The Cyanide Plant of the Baker Mines Co., Cornucopia, Oregon (66460). Robert M. Keeney. Ills. 4500 w. M & C E—Dec. 15, 1915. Description.

Nevada Packard Reduction Plant at Rochester, Nev. (66027). K. Freitag. 1200 w. M & E W—Nov. 27, 1915. Plant and method.

Cyanidation in Western Australia (66089). V. F. Stanley Low. Ills. 3000 w. M & S P—Nov. 27, 1915. Details of plant in Yilgarn district.

The Metallurgy of the Sons of Gwalia Mine Ore (66313 N). Thomas B. Stevens. 4500 w. C M W A J—Sept., 1915. Amalgamation and cyanidation.

Metallurgical Practice in the Witwatersrand District, South Africa (66417 D). 8000 w. A I M E Bul—Dec., 1915. Discussion of F. L. Bosqui's paper.

Influence of Heat in Cyaniding Gold Ores (67590 N). 3500 w. I M M—Jan. 13, 1916. Discussion of E. A. Wraight's paper.

Metallurgical Practice in the Witwatersrand District, South Africa (67439 D). 1500 w. A I M E, Bul—Jan., 1916. Discussion of paper of F. L. Bosqui.

Blast Furnace Smelting of Cyanide Precipitate (67318). Regis Chauvenet. 4000 w. M & C E—Jan. 15, 1916. Early method and new departure.

Important Factors in the Operation of the Cyanide Process (68606). G. H. Cleverger. Extract from paper before 2nd Pan-Am. Cong. 1500 w. C M J—March 1, 1916. General.

The Liberty Bell Methods of Precipitate Refining (68531 D). 3000 w. A I M E, Bul—March, 1916. By acids and by fusion.

Precipitating Action of Carbonaceous Shale in Cyanide Solution (69405). Paul W. Avery. 1200 w. M & S P—April 8, 1916. Experiments and results.

Estimating Metallic Aluminum in Aluminum Dust (70205). J. E. Clennell. 2000 w. E & M J—May 6, 1916. Gasometric and volumetric methods.

Effect of Black Slate on Cyanidation (70547). H. Fischer. 1800 w. M & S P—May 20, 1916. Importance of eliminating graphite.

Working Data on Electrolytic Precipitation (69998). P. H. Crawford. 4000 w. M & S P—April 29, 1916. Particulars of process at Minas Prietas.

Gold

Gold Mining in War Time (73551 N). 4500 w. C M W A, J—June, 1916. Conditions in Western Australia, and handicaps intensified by the war.

Gold Fields

Boston Creek Gold Area (72701). A. G. Burrows and P. E. Hopkins. Ills. 3000 w. C M J—Aug. 15, 1916. Information concerning this region in the Timiskaming district, and geology and mineralogy.

Idaho

Rich Gold Ore Found in Idaho (74173). Robert N. Bell. 2800 w. E & M J—Oct. 28, 1916. Recent discoveries on the property of the Boise-Rochester Mining Co., and other developments.

Manitoba

The Manigotagen Gold District, Manitoba (72387). Justin S. De Lury. Ills. 2200 w. C M J—Aug. 1, 1916. The Rice Lake, Gold Lake and Long Lake areas.

Montana

Gold Mining in the Judith Mountains, Montana (70991). O. W. Freeman. Ills. 2000 w. M & S P—June 10, 1916. Production of \$9,000,000 in gold.

Oatman

The Oatman District, Arizona (72340). Leroy A. Palmer. Ills. 2500 w. M & S P—Aug. 5, 1916. Reviews the history of this gold-mining district, the geology, vein formation, etc.

Patio Process

The Patio Process (71549). Ills. 1200 w. E & M J—July 1, 1916. Descriptive.

Philippines

Gold Mining in the Philippines (71161). C. M. Eye. Map. 1800 w. M & S P—June 17, 1916. Reviews the important mines.

Platinum

Further Experiments on the Volatilization of Platinum (71316). G. K. Burgess and R. G. Walterberg. 8 pp. U S B S—Scientific Paper 280. Observations on changes of weight at high temperatures.

Platinum and Allied Metals in 1915 (72618 N). James M. Hill. 17 pp. U S G S I:6—Aug. 15, 1916. Production, prices, mines, uses, etc.

Le Platine Et La Guerre (73535 B). J. Vichniak. 2700 w. La Nt—Sept. 9, 1916. Sources of supply, prices, etc.

Platinum (73015 A). 3000 w. Eng—Aug. 18, 1916. Its rare physical properties; the Russian supply; uses, etc.

Precipitate Refining

Refining Cupriferos Precipitate (68283). Jackson A. Pearce. 2500 w. M & S P—Feb. 19, 1916. Details of method used.

Consult Classification of the Index. See page 7.

Radium**Radium**

Occurrence, Geology and Economic Value of the Pitchblende Deposits of Gilpin County, Colorado (71015 B). Percy R. Alsdorf. 10 pp. E G—April-May, 1916. Study of this region.

Rand

Will American Capital Be Attracted to the Far Eastern Rand? (71279). A. Cooper Key. 2500 w. E & M J—June 24, 1916. Details of report of R. N. Kotze are discussed.

Rare Metals

The Metallurgy of the Rarer Metals (71578). Joseph W. Richards. 7000 w. M & C E—July 1, 1916. Read before Am. Inst. of Chem. Engrs. 7000 w. M & C E—July 1, 1916. Possibilities.

Review of 1915

Metallurgy of Gold and Silver (67162). Herbert A. Megraw. 2500 w. E & M J—Jan. 8, 1916. Progress during 1915.

Slime Settling

Laboratory Method for Determining the Capacities of Slime-Settling Tanks (68529 D). H. S. Coe and G. H. Clevenger. Ills.

MISCELLANY**Copper**

7000 w. A I M E, Bul—March, 1916. Experimental work.

Sluicing

Winter Sluicing at the Lenskoi Gold Mines, Siberia (73756 A). C. W. Purington and R. E. Smith. Ills. 5000 w. M Mg—Sept., 1916. Method and plant now in use.

Stamp Mills

An Improved Circular-Feed, All-Screen Mortar for Stamp Mills (69249). E. H. Moyle. Ills. 1500 w. M & E W—April 1, 1916. Moyle mortar.

Urals

Precious Stones in the Urals (72142 B). C. W. Purington. Map. 1200 w. M Mg—July, 1916. Noted for gold, silver, copper, precious, and semi-precious stones, particularly emerald deposits.

World's Mines

The Great Gold Mines (72958). Ills. 3800 w. M & S P—Sept. 2, 1916. Editorial review of their output, dividends, and reserves. Describes the Rand, Kalgoorlie and Indian mines, with figures of recent production.

MISCELLANY**Agricola, Georg**

Georg Agricola and His Chief Work "De re Metallica" (72583 A). Ills. 2500 w. I & C T R—Aug. 4, 1916. Review of an interesting old book on mining, printed in Latin.

A. I. M. E.

Institute Meeting in Arizona (73919). P. E. Barbour and R. D. Hall. Ills. 6000 w. E & M J—Oct. 14, 1916. Details of the visit of the A. I. M. E. to the big mines and reduction works of Arizona.

Alaska

The Alaskan Mining Industry in 1915 (72247 N). Alfred H. Brooks. Map. 66 pp. U S G S—Bul. 642-A. Results achieved during the year.

Argall, Philip

Philip Argall and Metallurgical Progress (67554). T. A. Rickard. Ills. 9000 w. M & S P—Jan. 22, 1916. An interview. Review of experience and progress.

Arizona

Metallurgical Plants of Arizona (72482). Map. 3000 w. M & C E—Aug. 15, 1916. Summary of metallurgical practice and itinerary of tour of A. I. M. E.

British Mining

British Mining Industry and the War (69591 A). 3000 w. C G—March 24, 1916. From presidential address of R. A.

S. Redmayne. Problems of national importance.

British Mining Industry in Relation to the War (70348 N). R. A. S. Redmayne. 25 pp. I M M, Bul 139—April 27, 1916. Effect on the economic position; resources; organization of scientific and industrial research.

Canada

Annual Report on the Mineral Production of Canada During the Calendar Year 1914 (71026 N). John McLeish. 350 pp. C D M—No. 384. Statistics.

Conservation

Conservation of Mineral Resources (66145). Excerpts from address by H. M. Chance. 1700 w. E & M J—Dec. 4, 1915. Conservation of labor important.

Improved Mining and Metallurgy an Aid to Conservation (68047). L. D. Ricketts. 1500 w. E & M J—Feb. 12, 1916. Effect of cheaper methods, etc.

Conservation of Mineral Resources (71033 N). H. M. Chance. 2500 w. C M I, Bul—June, 1916. Address at dedication of Mines Building, State College, Pa.

Copper

Copper in 1914 (66432 N). B. S. Butler. 56 pp. U S G S, 1:17—Dec. 8, 1915.

Economics of the World's Supply of Copper (67415). Thomas T. Read. 1000 w. M & S P—Jan. 15, 1916. Abstract

Fertilizer

of paper before Int. Engng. Cong. Ore reserves; copper trade.

The Copper Situation in Canada from the Point of View of the Consumer (68640 N). G. C. Brown. 2500 w. C M I, Bul—March, 1916. Canada's needs.

Fertilizer

Making Basic Phosphate Fertilizer as By-Product in Iron Smelting (71611). H. Cole Estep. Ills. 1200 w. M Rd—July 6, 1916. Manufacture from open-hearth slag.

See also Peat, under *Coal and Coke*.

Gold Production

The World's Production of Gold in 1915. Also Production in United States (67883 A). Ills. 2500 w. M & E W—Feb. 5, 1916.

Japan

L'Industrie Minière et Métallurgique au Japon (72773 B). J. Maïto. Ills. 2600 w. La Nt—July 29, 1916. Brief summary of the mining and metallurgical industries in Japan.

Laboratories

Description of the Laboratories of the Mines Branch of the Department of Mines, Ottawa (68654 N). Ills. 45 pp. C D M, Bul 13—No. 406.

Lead and Zinc

Lead and Zinc Industry in the United States (67886 A). Ills. 2500 w. M & E W—Feb. 5, 1916. Production, prices, consumption, etc.

Legislation

Uniform Mine Legislation (67282). 2500 w. Cl A—Jan. 15, 1916. Serial, 1st part. Points brought out by members of Mine Inspectors' Inst., U. S. A.

Metallography

Recent Progress in Metallography (74118 N). William Campbell. 60 pp. A I Mt—Sept., 1916. Outlines recent work in metallography, treating the subject under eight heads: Metals, binary, ternary, and miscellaneous alloys, electrical properties, corrosion, new applications of methods, and recent books and comment.

Metallurgy

Some Problems in Physical Metallurgy at the Bureau of Standards (71767 B). George K. Burgess. 16 pp. F I, JI—July, 1916. Methods applied to the solution of various problems.

The Metallurgy of the Rarer Metals (72338 N). J. W. Richards. 5000 w. JI I & E C—Aug., 1916. High-priced metals which might be cheapened by improving metallurgical processes.

Metals in War

I Metalli Di Guerra (72807 C + D). Luigi Barberis. 6500 w. R M—May, 1916. Comprehensive review of produc-

MISCELLANY

tion, etc., of iron, steel, nickel, manganese, etc., during the war.

Mineral Resources

The Public Interest in Mineral Resources (67345 N). George Otis Smith. 5000 w. U S G S—I: A, Dec. 31, 1915. Part I of review of mineral resources of United States.

Minerals

The Chemistry of Minerals (72814). Joseph E. Pogue. 4500 w. E & M J—Aug. 5, 1916. Impurities usually present and their effect.

Mining

The Business of Mining (72585). W. R. Ingalls. 6000 w. M & S P—Aug. 19, 1916. Address before the Missouri Sch. of Mines. A business not a profession.

Mining Laws

The Antecedent Mineral Discovery Requirement (73275 D). E. D. Gardner. 14 pp. A I M E, Bul—Sept., 1916. Reviews arguments in favor of the proposed change of the discovery requirement.

Revision of the Mining Law (73920). 4500 w. E & M J—Oct. 14, 1916. Questionnaire sent to members and others, with excerpts from principal correspondence.

Ore Buying

Buying and Selling Nonferrous Metals of South America (68048). Ludwig Vogelstein. 5000 w. E & M J—Feb. 12, 1916. Complex business.

Pitch

Carbonization of Pitch (72775). 1000 w. T E S—July 28, 1916. English experience with pitch in gas works.

Production

Post - Bellum Mineral Production (66292 A). Arthur Selwyn-Brown. 2500 w. E M—Jan., 1916. Predicts continuance of present high production.

Gold and Silver in 1914 (67541 N). H. D. McCaskey. 40 pp. U S G S, I: 23—Jan. 20, 1916. General report.

Lead in 1914 (67380 N). C. E. Siebenthal. 27 pp. U S G S, I: 22—Jan. 14, 1916. General report.

Reviews of 1915

Copper Industry in 1915 (67154). Map. 7000 w. E & M J—Jan. 8, 1916. General review; statistics of production; districts; smelting, etc.

Gold and Silver (67152). Frederick Hobart. 2200 w. E & M J—Jan. 8, 1916. Production and commercial movement.

Production of Lead in 1915 (67155). Map. 4500 w. E & M J—Jan. 8, 1916. General review; production; districts, etc.

Chart of Metal Prices in 1914 and 1915. Also Course of Metal Prices since 1879 (67158). E & M J—Jan. 8, 1916.

Consult Classification of the Index. See page 7.

Silver

Charts plotted from monthly and annual averages.

Zinc Industry in 1915 (67156). 3500 w. E & M J—Jan. 8, 1916. General review; production; districts; smelting, etc.

Silver

Silver Market Conditions in China (67441). G. G. S. Lindsey. 1200 w. C M I—Jan., 1916. Tables of export and import of silver, with explanation of financial conditions.

The World's Production of Silver in 1915. Also Production in United States (67884 A). Ills. 2000 w. M & E W—Feb. 5, 1916.

Southern States

Certain Minerals as the Basis of Southern Chemical Industries (73142 A). W. C. Phalen. Ills. 4000 w. M Rd—Sept. 14, 1916. Outlines metallic and non-metallic minerals which occur in abundance.

Chemical Industries and the South: Limitless Raw Materials (73131 A). Charles E. Coates. 5000 w. M Rd—Sept. 14, 1916. Outlines the chemical potentialities, and opportunities for development.

Sulphuric Acid

New Sulphuric Acid Plant (73308 A). T. N. Harris. Ills. 3800 w. M & C E—Sept. 15, 1916. Plant at Donora, Pa. Its construction and process of manufacture.

Taxation

The Taxation of Mining Companies (69334). 5000 w. C M JI—April 1, 1916.

MISCELLANY**Zinc**

Extracts from official report of debate in Can. House of Commons.

United States

Mineral Production of the United States in 1914 (67274 N). H. D. McCaskey. 69 pp. U S G S, I: A—Feb. 10, 1916. A summary.

U. S. Bureau of Mines

Origin and Development of the U. S. Bureau of Mines, and Its Work in Utah (73834). D. A. Lyon. 2800 w. U S E, JI—Aug., 1916. Co-operative work.

Works Tramways

Metallurgical Works Tramways (73821). W. C. Capron and C. R. Kuzell. Ills. 3000 w. E & M J—Oct. 7, 1916. Locomotives and cars in general use.

Zinc

Zinc and Cadmium in 1914 (67983 N). C. E. Siebenthal. 50 pp. U S G S, I: 24—Feb. 1, 1916. Statistics of production and use.

The Occurrence and Utilization of Zinc Ores (68736 N). 8000 w. Imp Inst Bul—Oct-Dec., 1915. Serial, 1st part. Elementary but inclusive.

The Zinc Industry in America (68402 N). J. A. Van Mater, with discussion. 7500 w. C M I, Trans—1915. General review.

Spelter Statistics for 1915 (69236). W. R. Ingalls. 6500 w. E & M J—April 1, 1916. Revised statistics of production.

RAILWAY ENGINEERING

CONDUCTING TRANSPORTATION..	327	ROADS AND PROJECTS.....	352
MOTIVE POWER AND EQUIPMENT	331	TRAFFIC	355
PERMANENT WAY AND BUILDINGS	345	MISCELLANY	357

Accidents

Accidents

The Jarrow Disaster (67339 A). 2000 w. Enr—Dec. 31, 1915. Board of Trade inquiry.

A Disastrous Collision with an Unusual Cause (67495). Ills. 2000 w. R A G—Jan. 21, 1916. Butting collision on the Nashville, Chattanooga & St. Louis.

A False Clear Signal with Disastrous Results (67905). Ills. 2500 w. R S E—Feb., 1916. Account of accident on the N. C. & St. L. on Dec. 23, 1915, explaining cause.

Investigation of the Milford Collision (68523). 4500 w. R A G—March 3, 1916. Cause; editorial comment on this New Haven accident.

Full Investigation of Amherst Accident (69353). 2500 w. R A G—April 7, 1916. Testimony concerning N. Y. Central wreck.

The Bradford Collision (69927). 3300 w. R A G—April 28, 1916. On the New Haven.

Report on Milford Collision (69355). 1600 w. R A G—April 7, 1916. On New Haven.

Accidents at Grade Crossings and to Trespassers (71099). Alex. Gordon. Read before Board of Supervisors of Calif. 4000 w. R A G—June 16, 1916. Casualties and remedies.

Italy's Numerous Accidents Resulting from Unpreparedness (70913). Walter S. Hiatt. 1200 w. R A G—June 9, 1916. Unable to handle immense war traffic.

Recovering a Wrecked "Pacific" Locomotive (71019 A). Ills. 1500 w. R E—June, 1916. Recovery of an engine that fell down a mountain side in Italy.

Block Signaling

Mileage of American Railroads Block Signaled (66846). 3000 w. R A G—Dec. 31, 1915. Space interval in use on nearly 100,000 miles.

CONDUCTING TRANSPORTATION

Electric Lighting

Brakes

Report of Committee on Train Brakes and Train Air Signals (71874 N). Ills. 6 pp. M C B A—May 13, 1916.

Freight Brake Conditions (71580 A). Walter V. Turner. 1200 w. R & L E—July, 1916. Damage from rough handling.

Passenger Train Braking (71581 A). 2200 w. R & L E—July, 1916. Starting and stopping of trains.

British Railways

British Railways (74094 A). 3500 w. Enr—Oct. 6, 1916. Serial, 1st part. Capital investments and expenditures.

Cab-Signaling

Cab-Signaling and the Pollokshaws Collision (66319 A). Diagram. 1500 w. R G—Nov. 26, 1915. Weaknesses of line semaphore system, details of "Raven" system.

Collision

The Bletchley Collision (73005A). Diagrams. 1200 w. R G—Aug. 25, 1916. Accident at crossover junction on an English railway.

Derailments

Car Derailments, Causes and a Remedy (66181 A). H. M. Perry. Ills. 1200 w. R A G, M E—Dec., 1915.

Efficiency

Efficiency Testing on the Pennsylvania (72514). 3000 w. R A G—Aug. 18, 1916. Results of inspection of train service on the Schuylkill Division.

Efficiency of Railway Service in the United States (73846). Arthur W. Thompson. 5500 w. S L R C, Pro—Sept. 8, 1916. Information bearing on railway problems and showing the efficiency.

Electric Lighting

Elektrische Weichen-, Signal- und Stellwerksbeleuchtung (68805 B). Van Heys. Ills. 3000 w. G A G B—Feb. 15, 1916. Discussion of electric lighting as used for switches, signals and interlocking.

Consult Classification of the Index. See page 7.

France

CONDUCTING TRANSPORTATION

Signaling

France

Railway Transport Arrangements in France (69051 N). R. Bonham-Smith. 8500 w. R U S I, JI—Feb., 1916. Of British Army.

French Railway Traffic and the War (73105 A). 2800 w. Eng—Aug. 25, 1916. Reviews conditions in the year 1915 showing service rendered.

Les Chemins De Fer Dans La Conduite De La Guerre (73527 B). Ills. 3200 w. La Nt—Sept. 2, 1916. Adapting the French railways to the requirements of war.

L'Organisation Et Le Rôle Des Chemins De Fer En Temps De Guerre (73507 B). Ills. 2700 w. La Nt—Aug. 12, 1916. What the French railways are doing in the war.

Freight Cars

The Unnecessary Movement of Empty Freight Cars (72690 A). 2500 w. R G—Aug. 11, 1916. Abstract of report to the Gen. Supts. Assn. of Chicago.

Impact

Difference of Force of Impact Between Vehicles in a Moving Train of Cars (72238 A). Walter V. Turner. 1500 w. R & L E—Aug., 1916. Forces that may be set up between different cars of a train.

Interlocking

Testing a New Interlocking Plant (65581). 1800 w. Sig Engr—Nov., 1915. Outlines points to be noted and methods recommended.

Electric Interlockings in Australia (65579). C. G. Pilkington. Ills. 3000 w. Sig Engr—Nov., 1915. Details of first installation.

Electric Interlocking at Adelaide, South Australia (65853). C. G. Pilkington. Ills. 2000 w. Ry Age Gaz—Nov. 19, 1915. Speed signaling and three-position upper quadrant indications.

Electric Interlocking in Philadelphia (67903). D. E. Spangler. Ills. 3000 w. R S E—Feb., 1916. A successful 55-lever plant.

Mechanical Interlocking (68819 C). Ills. 22 pp. Ry S A JI—Mar., 1916. Committee report.

Power Interlocking (68820 C). Ills. 10 pp. Ry S A JI—Mar., 1916. Committee report.

A New York Central Plant in Chicago (68601). Ills. 1200 w. R S E—March, 1916. Details of all-electric installation.

Power Interlocking (70154 C). 5 pp. Ry S A JI—May, 1916. Recommendations.

Mechanical Interlocking (70148 C). 14 pp. Ry S A JI—May, 1916. Discussion of committee report.

Mechanical Interlocking (70153 C). Ills. 57 pp. Ry S A JI—May, 1916. Committee recommendations.

Method for Checking Mechanical Locking (70235). L. R. Stahl. 700 w. R S E—May, 1916. Demonstration of system.

The Golden Gate Electric Interlocking (70233). W. D. Cloud. Ills. 1800 w. R S E—May, 1916. New Plant at Oakland.

Electric Interlocking at Utica, N. Y. (72326). B. A. Lundy. Ills. 1500 w. R S E—Aug., 1916. Detailed description of excellent practice.

Italy

Le Ferrovie E Il Ministero Dei Trasporti (72819 C). 2600 w. I F—July 15, 1916. Railways and the Minister of Transportation in Italy.

Lighting

See Train Lighting, under ELECTRICAL ENGINEERING, *Illumination*.

Operation

Studies in Operation—The Western Maryland (72274). Ills. 5000 w. R A G—Aug. 4, 1916. History of property; conditions in 1913 and 1914; organization and results.

Phase Meter

The Phase Meter and Its Applications (68605). John S. Holliday. Ills. 4000 w. R S E—March, 1916. Adjusting a c. track circuits.

Reclaiming

Reclaiming Signal Material from Scrap (65644 A). Ills. 1200 w. Ry Engng & Main of Way—Nov., 1915. Possibilities of repairing.

Signaling

A. C. L. Signaling Between Richmond and Pleasant Hill (65582). A. W. Stewart. Ills. 1000 w. Sig Engr—Nov., 1915. Automatic block signaling.

The Signaling of the Queens Park Extension (65665 A). Ills. 1800 w. Elect'n, Lond—Oct. 29, 1915. Latest example of signaling on a tube railway.

A New Cab Signal and Automatic Stop (65583). Ills. 3000 w. Sig Engr—Nov., 1915. Installation on Western Pacific uses magnetic induction and eliminates roadside signals.

British and American Railroad Signaling (66301). T. S. Lascelles. Ills. 3500 w. Sg E—Dec., 1915. Differences in practice.

The Economics of Railway Signaling (67186). A. G. Shaver. 2500 w. R E—Jan. 8, 1916. Importance of interlocking and block signaling for economical and efficient operation.

Review of the Past Year in Signaling (67189). 5000 w. R S E—Jan., 1916.

Power Equipment for Alternating Current Signalling at Interlocking Plants

Consult Classification of the Index. See page 7.

Signaling

CONDUCTING TRANSPORTATION

Signaling

(66977 A). Harry M. Jacobs. Ills. 2200 w. G E R—Jan., 1916. Classifies requirements; equipment necessary.

Remedies for Track Circuit Ailments (67190). James Anderson. Ills. 5000 w. R S E—Jan., 1916. Locating and treating signal failures.

A. C. Signaling for Chicago Terminals (67191). Map. 2000 w. R S E—Jan., 1916. From Committee report of Chicago Assn. of Commerce. Cost of changing systems.

New Alternating Current Signal Installation on the Grand Trunk (67141). Ills. 1500 w. R A G—Jan. 7, 1916. Unusual track circuit conditions.

New Automatic Signals on Grand Trunk (67188). B. Wheelwright. Ills. 3500 w. R S E—Jan., 1916. Adoption of A. C. system on 19-mile section.

Principles of Railway Block and Interlocking Signals (68020 A). Ills. 2500 w. R E & M W—Feb., 1916. Harold McCready in paper to Richmond Ry. Club.

Report of Committee X—On Signals and Interlocking (68108 N). 2500 w. A R E A, Bul—Nov., 1915. Recommendations.

All Electric Railway Signals at Adelaide (68176 N). C. G. Pilkington. Ills. 2000 w. Cw E—Jan., 1916. Description.

New Single-Track Automatics on D. & H. (67904). Ills. 900 w. R S E—Feb., 1916. For 23-mile installation.

Exposition of Three Schemes of Signaling (68818 C). Ills. 56 pp. Ry S A JI—Mar., 1916. Committee report.

The Revised Standard Code: Signaling Rules (68940). C. C. Anthony. 5000 w. R A G—March 17, 1916. Serial, 1st part. Radical criticism.

The Principles of Electric Locking (68600). James Anderson. Ills. 4000 w. R S E—March, 1916. Serial, 1st part. Locking circuits and appliances.

Electrical Testing (68824 C). Ills. 8 pp. Ry S A JI—Mar. 1916. Committee recommendations.

Standard Designs (68823 C). Ills. 17 pp. Ry S A JI—Mar., 1916. For signaling apparatus. Committee recommendations.

Wires and Cables (68821 C). 6 pp. Ry S A JI—Mar., 1916. Committee report; specifications, etc.

Visual Signaling (69046 N). Harold Green. 3000 w. I M E, Trans—Feb., 1916. Essential requirements. Also discussion.

Progress in Signaling an Important Line on the L. & N. (68605). Ills. 1800 w. R S E—March, 1916. Automatic installation.

Reconstruction of New Haven Signals (68603). Ills. 2000 w. R S E—March, 1916. Details.

A Review of the Art of Signaling and Some Suggestions (69689 N). A. F. Bound. Ills. 126 pp. Instn Ry Sig Engrs Pro—1915. Compelte review; with discussion.

The Revised Standard Code: Signaling Rules (69519). C. C. Anthony. 5500 w. R A G—April 14, 1916. Criticism of caution indications.

Fundamentals of Signaling (70364). Kenneth L. Van Auken. 1200 w. R R—May 13, 1916. Differences in system of signaling and interlocking.

Signaling Practice (70152 C). Ills. 28 pp. Ry S A JI—May, 1916. Report.

Exposition of the Schemes of Signaling (70238). 7000 w. R S E—May, 1916. Analysis of meaning of each aspect in three systems adopted by R. S. A.

Direct Current Automatic Block Signaling (70155 C). 33 pp. Ry S A JI—May, 1916. Committee report.

Wires and Cables (70157 C). 4 pp. Ry S A JI—May, 1916. Committee report.

Standard Designs (70151 C). 10 pp. Ry S A JI—May, 1916. Discussion of committee report.

Standard Designs (70156 C). Ills. 9 pp. Ry S A JI—May, 1916. Committee recommendations.

Resume of Signal Construction Methods (70234). H. D. W. Riley. 2500 w. R S E—May, 1916. Plans for handling materials and organizing men.

Testing A. C. Relays and Adjusting Track Circuits (70237). F. D. Morehart. 1500 w. R S E—May, 1916. Methods.

Electrical Testing (70150 C). 10 pp. Ry S A JI—May, 1916. Discussion of committee report.

Overcoming a Hazard in A. C. Track Circuits (70236). W. D. Cleveland. 1200 w. R S E—May, 1916. Improved method of protecting copper cables.

Analytical Method of Solving Track Circuit Problems (70158 C). C. E. Estwick. Ills. 15 pp. Ry S A JI—May, 1916. Mathematical.

Some Points of Contact Between Permanent Way and Signaling (71204 B). G. G. Hutt. Ills. 3000 w. P-W I, JI—April, 1916. Various points where the work joins up.

Service Record of Position-Light Signals (70834). A. H. Rudd. Ills. 4000 w. R S E—June, 1916. Latest developments and cost.

Three-Position Signals, Victorian Government Railways (70845 A). Ills. 3000 w. R G—May 19, 1916. Interesting features of automatic signaling scheme.

Signaling

CONDUCTING TRANSPORTATION

Track Circuit

New Signal Protection on A. C. L. (71698). Ills. 1800 w. R S E—July, 1916. Including automatics on double track, and electro-mechanical plant at junction.

Signaling on the Lackawanna Cut-Off (71696). B. T. Anderson. Ills. 1200 w. R S E—July, 1916. Installation on 40-mile line.

The Signaling of Jersey City Terminal (71838). Ills. 1500 w. R G—June 30, 1916. New electro-pneumatic interlocking plant.

Scientific Selection and Location of Signals (72329). O. V. Fry. Ills. 2000 w. R S E—Aug., 1916. Abstract of paper read before the Ec. Psychology Assn. Method of making tests.

Signaling for a 75-Second Headway (72328). Ills. 1500 w. R S E—Aug., 1916. Light indications used on electric line.

Signal Maintenance Methods and Costs (72327). Ills. 1500 w. R S E—Aug., 1916. High standards on L. & H. single track line.

All-Electric Signalling at Adelaide, South Australia (73003 A). C. G. Pilkington. Ills. 1800 w. R G—Aug. 25, 1916. Details of new system installed.

Service Tests on A. C. Signal Apparatus (73092). J. E. Saunders. Ills. 2200 w. R S E—Sept., 1916. What the maintenance force should do to secure satisfactory service.

Signaling a New Street Car Terminal (73093). Ills. 1400 w. R S E—Sept., 1916. Electro-pneumatic interlocking and light signals at Newark, N. J., on Public Service lines.

Signaling the Milwaukee's Electric Zone (73091). Ills. 1200 w. R S E—Sept., 1916. A. C. light signals used for 440 miles of main line.

Daylight Lamp Signals on the Pennsylvania Railroad (73225 A). Ills. 1500 w. Enr—Sept. 1, 1916. Details of new system which dispenses with semaphores and colored lamps.

Cab Signals and Automatic Stops on the Western Pacific Railroad (74083 A). Ills. 2000 w. R G—Oct. 6, 1916. Automatic block system installed on single-track road at Oroville, Cal.

Terminal Signaling with 45 Seconds Headway (73865). Ills. 2500 w. R A G—Oct. 13, 1916. System on San Francisco-Oakland pier line.

Signaling Practice

Development of Main-Line Signaling on Railways (65668 A). W. C. Acfield. Ills. 4500 w. Engng—Oct. 29, 1915. Serial, 1st. part. Read before Birmingham

Sec. of Inst. of Elec. Engrs. Outlines the various systems.

Signal Maintenance

Some Notes on Signal Maintenance (70683). A. G. Shaver. 1500 w. R R—May 27, 1916. Present practice.

Signal Protection

Protection of Railway Signal Circuits Against Lightning Disturbances (66056 A). E. K. Shelton. 1200 w. G E R—Dec., 1915.

Signals

Demonstration of Some Savings Effected by Signals (70835). F. W. Rizer. 1000 w. R S E—June, 1916. Saving by use of automatic signals. Curves.

"Position Light" Signals on the Pennsylvania (71953). Ills. 1500 w. R A G—July 21, 1916. Results of operation.

Railroad Day and Night Signals (71512 A). B. H. Mann. 6000 w. E C St L, JI—May-June, 1916. Types and their applications.

Snow

Railway Engineering in the Northwest—Rotary Snow Plows and Snow Sheds Ready for Winter (66979 A). Ills. 2000 w. R & L E—Jan., 1916. Problems and methods of solving.

Keeping a Railroad Line Open During Snow Storms (67496). Two articles by Coleman King and by W. G. Dungan. 3000 w. R A G—Jan. 21, 1916. Methods under different conditions.

Storage Batteries

Storage Battery and Charging Equipment (68822 C). Ills. 12 pp. Ry S. A. JI—Mar., 1916. Committee recommendations.

Storage Battery and Charging Equipment (70149 C). 8 pp. Ry S A JI—May, 1916. Discussion of committee report.

Superintendents

The Qualifications of a Terminal Station Superintendent (71170 A). S. W. Roberts. 1800 w. R G—June 9, 1916. Requirements.

Switching

Individual Paper on Impact Between Freight Cars in Switching Service (68362 N). Louis E. Endsley. Ills. 25 pp. Car Bldrs' Assn, Pro—Vol. 49, 1915. Experiments, also discussion.

Time Standards

Eastern and Central Time Standards in Ohio and Michigan (67850). Myron E. Wells. 1200 w. R A G—Feb. 4, 1916. Confusion from recent changes by Cleveland and Detroit.

Track Circuit

William Robinson, Inventor of the Track Circuit (73090). Ills. 2000 w. R S E—Sept., 1916. Historical account of his work.

Consult Classification of the Index. See page 7.

Train Control**MOTIVE POWER AND EQUIPMENT****Air Brakes****Train Control**

Cab Signals and Train Control (65471 B). Ills. 2000 w. Ry Engr—Nov., 1915. Description of Raven system.

The Vital Relation of Train Control to the Value of Steam and Electric Railway Properties (74030 B). Walter V. Turner. Ills. 12000 w. F I, JI—Oct., 1916. Serial, 1st part. Present state of railway science, traffic capacity factors and their limitations.

Train Control on the East Indian Railway (73754 A). Diagrams. 1500 w. R G—Sept. 22, 1916. Installation in use for past three years.

Train Dispatching

Guiding Trains by Telephone (72986 A). W. A. Wolff. 2500 w. T E—Sept., 1916. Advance of the art in railroad practice.

Train Flagging

Better Flagging (71738). Grant Selby, with discussion. 2500 w. S L R C, Pro—June 9, 1916. Criticisms and suggestions.

Train Handling

Proper Handling of Passenger Trains (70561 A). Robert Burgess, with discussion. 8500 w. S & S-W R C, Pro—March, 1916. Instructions.

Train Handling on Heavy Grades (73394). Edward F. McKenzie. 1800 w. R A G—Sept. 22, 1916. Instruction

rooms on the Pittsburgh Division of the Pennsylvania R. R.

Train Heating

Heating Boilers for Electric Locomotives (70970). Ills. 3500 w. El R JI—June 10, 1916. Oil-fired boiler for heating passenger trains.

Train Lengths

Long Freight Trains and Railway Accidents (70338). 6500 w. R A G—May 12, 1916. Study of relation between lengths and accidents.

Train Rules

The Lately Revised Standard Code (67271). Harry W. Forman. 2500 w. R A G—Jan. 14, 1916. Serial, 1st part. Considers train rules and examiners.

Train Service

Efficiency Testing in Train Service (72065). H. E. Haanel. 2500 w. R A G—July 28, 1916. Effective methods.

Train Shocks

The Cause of Shocks in Long Freight Trains (67273 A). H. C. Priebe. From paper before the Car Foremen's Assn. of Chicago. 1000 w. R M E—Jan., 1916. Road conditions, slack in trains, suggestions.

Tunnel Operation

Detroit River Tunnel Operation (70214). Ills. 1800 w. El R JI—May 6, 1916. Analysis of remarkable reliability.

MOTIVE POWER AND EQUIPMENT**Air Brakes**

Broken Air Pipes with E. T. Equipment (65389 A). 2200 w. Ry & Loc Engrg—Nov., 1915. Temporary repairs.

Motor Driven Air Compressors (65388 A). Ills. 700 w. Ry & Loc Engrg—Nov., 1915. Describes types.

Effect of Moisture in the Air Brake System (66183 A). 1200 w. R A G, M E—Dec., 1915. Troubles caused.

Handling Defective E. T. Equipment (66177 A). 2500 w. R & L E—Dec., 1915. Suggestions for emergencies.

New York Air Brake Company's P. S. Electro-Pneumatic Brake Designed to Meet High-Speed Traffic Requirements (66176 A). Ills. 1000 w. R & L E—Dec., 1915. Principal features.

Charging Trains with E. T. Equipment (66984 A). 2500 w. R & L E—Jan., 1916. Suggestions for handling modern L. N., P. C., and U. C. brake equipments.

Brake Valve Manipulation (67842 A). 3500 w. R & L E—Feb., 1916. Good practice in train control.

Recent Developments in Brake Engineering Principles and Practice (68278 A). S. W. Dudley. Ills. 73 pp. N Y R C, Pro—Jan. 21, 1916. Air brake developments; short discussion.

Governor Synchronizing System (67841 A). Ills. 1000 w. R & L E—Feb., 1916. Principles of operation.

Handling Brakes on Yard Shifting and Passenger Car Service, and Daily Inspection of Locomotive and Tender Brakes (68597 A). 5000 w. R & L E—Mar., 1916.

Freight Car Air Brake Installation (68503 A). J. S. W. Fralich. Also discussion. 20 pp. W R C, Pro—Dec. 21, 1915. Specifications, with explanations.

The Empty and Load Freight Brake (69045). Walter V. Turner. Also discussion. Ills. 60 pp. S L R C, Pro—Feb. 11, 1916. Underlying principles.

Empty and Load Freight Brake Equipment (69521). Walter V. Turner. Ills. 2500 w. R A G—April 14, 1916. Tests.

Passenger Car Brake Design (69301 A). Walter V. Turner. 1000 w. R & L E—April, 1916. Proper relations.

Consult Classification of the Index. See page 7.

Air Pumps

Instructions to Yard Shifting Crews (69303 A). 1800 w. R & L E—April, 1916.

Repairing Triple Valves (69304 A). 1500 w. R & L E—April, 1916. Approved methods.

Design of Passenger Car Brakes When Braking Ratio Is Not Arbitrarily Chosen (70068 A). Walter V. Turner. 1700 w. R & L E—May, 1916. Problem of equipping when either length of stop or rate of retardation is chief requirement.

Repairing Air Compressors (70067 A). Ills. 2000 w. R & L E—May, 1916. Suggestions; work.

Triple Valve Lubrication (70068 A). 1700 w. R & L E—May, 1916. Recommends dry graphite.

A Recent Air Brake Trial on the P. R. R. (71057 B). R. D. Kavanaugh, with discussion. 6500 w. E C P, Pro—April, 1916. Tests of electro-pneumatic brake.

Requirements of an Air Brake (70804 A). Walter V. Turner. 1200 w. R & L E—June, 1916. Loss if brake is not right.

Operation of the New York Type P. S. Pneumatic Brake Equipment (72240 A). Ills. 1200 w. R & L E—Aug., 1916. Explanation.

Advantages of the Empty and Load Brake (72976 A). Walter V. Turner. 1200 w. R & L E—Sept., 1916. Braking ratios for various conditions of freight car loading.

Calculating Train Stop Distances (73694 A). 2000 w. R & L E—Oct., 1916. Formula and its use.

Air Pumps

Care of the Air Pump (72241 A). 1200 w. R & L E—Aug., 1916. Suggestions.

Anti-Collision Coach

Anti-Collision Railway Carriages (67026 A). Ills. 600 w. R E—Jan., 1916. Recent patented armored and reinforced construction.

Armored Cars

Carriage Rolling-Stock with Armored Ends, Interlocking Fenders, Collision Buffers and Reinforcements of Body Framing (71635 A). Ills. 1000 w. R G—June 16, 1916. To guard against telescoping of cars in collision.

Armored Car for the U. S. Army (72443). Ills. 700 w. R A G—Aug. 11, 1916. Detailed description.

Bath Train

Der Vereins-Badezug Rotes Kreuz Köln (Stiftung L. Hagen). (67058 B). D. Rudolph and Meyer. Ills. 1200 w. G A G B—Dec. 15, 1915. Red Cross bathing train, general description of equipment and operation.

MOTIVE POWER AND EQUIPMENT

Braking

Bearing Metals

Lagermetalle (68873 B). Halfmann. Ills. 2500 w. G A G B—Mar. 1, 1916. Brief review of purpose and characteristics of bearing metals.

Boiler Cleaning

The Cleaning of Locomotive Boilers (67519 A). E. J. H. South. Read before the Inst. of Loc. Engrs. Ills. 3500 w. R G—Jan. 7, 1916. Serial, 1st part. Reviews methods employed.

Boiler Efficiency

Locomotive Boiler Efficiency (73047 A). J. T. Anthony. 5000 w. R M E—Sept., 1916. Serial, 1st part. Firebox offers largest field for improvement at the present time.

Boiler Inspection

Annual Report of the Chief Inspector of Locomotive Boilers (67143). 1600 w. R A G—Jan. 7, 1916. Extracts from report of Frank McManamy.

Boiler Washing

Approved Method of Locomotive Boiler Washing (70805 A). Ills. 1800 w. R & L E—June, 1916. Methods, with details National Boiler Washing equipment.

Boiler Water

Water Treatment on the Missouri Pacific (72499 A.) Ills. 1500 w. R M E—Aug., 1916. Water-treatment plants.

Box Cars

Atchison, Topeka & Santa Fe Steel End Box Cars (67268). Ills. 700 w. R A G—Jan. 14, 1916. Details of cars of 40 tons capacity.

Building All-Steel Box Cars (67812). Ills. 1500 w. I T R—Feb. 3, 1916. Erecting at Altoona shops.

Steel Box Cars on the Pennsylvania (69400 A). Ills. 1000 w. R M E—April, 1916. Details.

Brakes

The Factor Which Determines the Choice of Single Shoe or Double Shoe Foundation Brake Gear (68595 A). Walter V. Turner. 2000 w. R & L E—March, 1916. Distance of desired stop.

Brake Shoes

Report of Standing Committee on Brake Shoe and Brake Beam Equipment (71877 N). Ills. 8 pp. M C B A—April 15, 1916. Subjects considered, tests, etc.

Braking

Proposed Standard Braking Ratio for Passenger Cars (67838 A). Walter V. Turner. 1600 w. R & L E—Feb., 1916. Suggesting 90 per cent braking ratio as standard.

Report of Committee on Brake Shoe and Brake Beam Equipment (68298 N). 36 pp. Mas Car Bldrs Assn, Pro—Vol. 49, 1915. Report and discussion.

Consult Classification of the Index. See page 7.

Caboose**MOTIVE POWER AND EQUIPMENT****Car Wheels****Caboose**

Caboose for Nashville, Chattanooga & St. Louis (73207). Ills. 800 w. R A G—Sept. 15, 1916. Steel frame construction. Used on trains where Mallet locomotives serve as pushers.

Caboose for the N., C. & St. L. (73809 A). Ills. 700 w. R M E—Oct., 1916. Detailed description.

Calibration Charts

Calibration Charts for Vanderbilt Tenders (65585 A). Towson Price. 1000 w. Ry Age Gaz (Mech Ed)—Nov., 1915. Method of calculation.

Car Construction

Report of Committee on Car Construction (68359 N). W. F. Keisel, Jr., chairman. 20 pp. Mas Car Bldrs' Assn, Pro—Vol. 49, 1915; with discussion.

Modern Methods of Car Building (67811). R. V. Sawhill. Ills. 3000 w. I T R—Feb. 3, 1916. Plant in Columbus, Ohio.; building steel cars.

Car Department

Problems of the Car Department (73049 A). E. E. Griest. 2500 w. R M E—Sept., 1916. Read at Chicago convention of General Foreman's Assn. Calls attention to the need of more accurate knowledge of car work.

Car Dumpers

American Car Dumpers (72573 A). Ills. 4000 w. C G—Aug. 4, 1916. Types of side dumpers.

Car Heating

See same heading under **MECHANICAL ENGINEERING, Heating and Cooling.**

Car Inspection

Denver Joint Car Interchange and Inspection Bureau (67194 A). William Hansen. 1000 w. R M M—Jan., 1916. Inspection facilities and their effect on reducing cost.

Car Lighting

Electric Lighting of Passenger Cars (66182 A). E. S. M. Macnab. 2500 w. Abstract of paper before Can. Ry. Club. R A G, M E—Dec., 1915. Systems and maintenance.

See **ELECTRICAL ENGINEERING, Illumination.**

Car Maintenance

The Upkeep of Railway Wagons (67340 A). 2000 w. Enr—Dec. 31, 1915. Review of cost.

Car Materials

Report of Committee on Specifications and Tests for Materials (68360 N). 38 pp. Mas Car Bldrs' Assn, Pro—Vol. 49, 1915.

Car Painting

Accelerated Drying of Paint on Passenger Coaches, Pennsylvania Railroad (70003). Ills. 1800 w. R R—April 29,

1916. Use of steam-heated ovens for hardening paints and varnishes.

Car Radiators

Tests of Four Types of Passenger Car Radiators (71888 N). Arthur J. Wood. Ills. 22 pp. A R M M A—April 18, 1916.

Car Repairs

Foreign Car Repairs and Billing (69298 A). E. S. Way. 4500 w. R M E—April, 1916. System developed.

Method of Handling Repairs to Foreign Cars and Billing for Same (70832 A). E. S. Way. 20 pp. R C P, Pro—March 24, 1916. Record blanks and their requirements for a reliable system.

Cars

Boston & Maine Steel Coaches (71748 A). Ills. 600 w. R M E—July, 1916.

Cars for the Transportation of Live Fish (71952). Ills. 500 w. R A G—July 21, 1916. Brief description.

Report of Committee on Tank Cars (71878 N). Ills. 43 pp. M C B A—May 23, 1916. Requirements to meet modern conditions.

Erie Railroad 50-Ton Capacity Hopper Cars (72515). Ills. 600 w. R A G—Aug. 18 1916. Three-hopper dumping arrangement, and other features.

Overzicht van de productie van Werkspoor op wagenbouwgebied (72788 B). J. R. Osinga. Ills. 3300 w. Ing—July 22, 1916. Description of rolling stock for main lines and tramways in Holland and her colonies.

Private Owners' Wagons (72523 A). Ills. 3000 w. R E—Aug., 1916. Regulations in regard to repairing, rebuilding, etc.

Seventy-Ton Gondola Cars (72501 A). Ills. 1200 w. R M E—Aug., 1916. Steel cars for Penn. R. R.

Canadian Northern Steel-Frame Passenger Cars (73838). Ills. 1500 w. R G—Sept. 29, 1916. Details of different classes.

Hopper Car of 200,00 Lb. Capacity (73728). Ills. 1200 w. R A G—Oct. 6, 1916. Detailed description.

New Standards in Passenger Car Construction, the Pullman Co. (73800). Ills. 2500 w. R R—Oct. 7, 1916. Improvements in steel cars.

Car Shops

De nieuwe fabriek bij Utrecht van de Nederlandsche Fabriek van Werktingen en Spoorwegmaterieel (74204 B). Ills. 5500 w. Ing—Sept. 9, 1916. Description of new car shops at Utrecht, Holland.

Car Wheels

The Chemistry of the Chilled Car Wheel (67967 A). Ills. 1500 w. R M M—Feb., 1916. Serial, 1st part. Con-

Consult Classification of the Index. See page 7.

Coal Cars

ditions of manufacture and service resulting in failures.

Coal Cars

Hopper Coal Cars for India (69397 A). Ills. 400 w. R M E—April, 1916. Steel. Analysis of the Coal Car Situation (73610). A. T. Shurick. 2500 w. C I A—Sept. 30, 1916. Comments from the leading coal roads.

Coal Preparation

The Preparation of Stoker Coal (69928). 1200 w. R A G—April 28, 1916. Screening mine-run.

Commercial Vehicles

The Commercial Motor Vehicle for Railway and Industrial Purposes (68623 A). Ills. 1500 w. R G—Feb. 18, 1916. Construction of Albion 32-h. p. machine.

Compounding

Topical Discussion: Advantages, If Any, of Compounding Superheater Locomotives (68235 N). 11 pp. Am Ry Mas Mech Assn—Vol. 48, 1915.

L'Emploi De La Détente Compound Et De La Surchauffe (72781 B). L. Baclé. 2600 w. Gn Cv—July 22, 1916. Effect of compounding and superheating on fuel consumption with French locomotives.

Condensers

L'application de la condensation sur les locomotives à vapeur (71329 B). J. Carlier. 3500 w. Gn Cv—June 3, 1916. Progress in using condensers on locomotives.

Control

Recent Installation Using Regenerative Control (73665). C. C. Whittaker. Ills. 1200 w. El JI—Oct., 1916. 1500-volt, direct-current regenerative locomotive for the L. Erie and Northern.

Counterbalancing

Report of Committee on Counterbalancing (68243 N). Ills. 15 pp. Am Ry Mas Mech Assn—Vol. 48, 1915. Principles, rules, determining overbalance, also discussion.

Couplers

Report of Standing Committee on Couplers (68299 N). R. L. Kleine, chairman. 60 pp. Mas Car Bldrs' Assn, Pro—Vol. 49, 1915. Report and discussion.

Cranes

See Steam Shovels.

Dining Cars

New Dining Cars on the Canadian Northern Railway (67195 A). Ills. 2000 w. R M M—Jan., 1916. Novel features of construction.

Draft Gear

Report of Committee on Draft Gear (71875 N). Ills. 15 pp. M C B A—May 13, 1916. Outline of work contemplated, and problems solved.

MOTIVE POWER AND EQUIPMENT**Electric Locomotives****Driving Axles**

Diameter of Driving Axle Journals (69395 A). L. R. Pomeroy. 1100 w. R M E—April, 1916. Diagrams and method of calculating.

Dynamometer Cars

Swiss Railways Dynamometer Car (66180 A). H. A. Gaudy. Ills. 3300 w. R A G, M E—Dec., 1915. Equipment.

Southern Railway High Capacity Dynamometer Cars (67491). Ills. 1500 w. R A G—Jan. 21, 1916. Detailed description.

Electrical Equipment

Report of Committee on Maintenance and Operation of Electrical Equipment (68244 N). Ills. 20 pp. Am Ry Mas Mech Assn—Vol. 48, 1915. Facilities required, operation, tools, and short discussion.

Electric Locomotives

Three - Thousand - Volt Direct - Current Electric Locomotives (65509). Ills. 1000 w. Sci Am—Nov. 6, 1915. Passenger locomotive of the C., M., & St. P. Ry.

The First 3000-Volt Locomotive for the Chicago, Milwaukee & St. Paul Railway Company (66062 A). E. S. Johnson. Ills. 1800 w. G E R—Dec., 1915. Interesting data.

The Liquid Rheostat in Locomotive Service (67680 D). A. J. Hall. Ills. 1200 w. A I E E, Pro—Feb., 1916. Arrangement of parts and means for controlling.

Locomotive Weights (68436). F. E. Wynne. 1000 w. El JI—March, 1916. Factors for specific service.

Switching Locomotives for the Chicago, Milwaukee & St. Paul Railway (68427 A). L. C. Josephs, Jr. Ills. 1500 w. G E R—March, 1916. Small unit.

Electric Locomotives for Spotting Service on the Niagara Junction Railway (68434). R. K. Culbertson. Ills. 1500 w. El JI—March, 1916. Details of operation.

Comparison of Railway Electric Locomotives (69414 A). Reginald Gordon. Ills. 1200 w. R M M—April, 1916. Various types.

Motors and Phase Converters on the N. & W. Locomotives (69246). J. V. Dobson. Ills. 1200 w. El R JI—April 1, 1916. Details of motors and phase converters.

The Main Motors and Phase Converters for the Norfolk & Western Locomotives (69262). J. V. Dobson. Ills. 1500 w. El JI—April, 1916. Motor design.

Electric Locomotive Drives (70971). F. H. Shepard. Ills. 3000 w. El R JI—June 10, 1916. Discusses details.

Electric Locomotive Maintenance on Pennsylvania Railroad (71149). Also edi-

Consult Classification of the Index. See page 7.

Electric Rolling Stock MOTIVE POWER AND EQUIPMENT**Electrification**

torial. Ills. 4000 w. El R JI—June 17, 1916. Reduced maintenance cost.

Electric Rolling Stock

Report of Committee on Design, Maintenance and Operation of Electric Rolling Stock (71893 N). Ills. 2000 w. A R M M A—April 15, 1916.

Electrification

Pennsylvania R. R. Electrifies Philadelphia District (65688). Ills. 3000 w. Eng News—Nov. 11, 1915. Overhead construction, signal system and rolling stock.

Pennsylvania Inaugurates Electric Service in Philadelphia (65718). Ills. 4000 w. Eng Rec—Nov. 13, 1915.

Electrification of the Pennsylvania at Philadelphia (65707). Ills. 4500 w. Ry Age Gaz—Nov. 12, 1915.

Victorian Railways Newport Power House (65622 N). Ills. 2000 w. Comnwlth Engr—Oct., 1915. Progress of the electrification scheme.

"Electrical Railways (66852 N). Henry Metcalf Hobart. Maps & Curves. 57 pp. I C E—Dec. 14, 1915. James Forrest lecture. Development.

Developments of Future in Electrification (66873). 4000 w. El R JI—Jan. 1, 1916. Discussed by prominent engineers.

Die massgebenden Gesichtspunkte bei der Systemwahl der elektr. Zugförderung (66274 B). W. Kummer. Ills. 2200 w. S B—Dec., 11, 1915. Decisive factors determining choice of electric traction system.

Estimated Costs of Chicago Terminal Electrification (66398). Maps and charts. 6500 w. El R JI—Dec. 11, 1915. Abstract of part of negative report.

Electrification of Four Mountain Divisions of the C. M. & St. Paul Railway (66650 A). A. C. Irwin. Ills. 1500 w. C C E—Dec., 1915. Interesting features.

Electrification of Charles City Western Ry. (66621). Ills. 4000 w. El T—Dec., 1915. Changed from gasoline motor car operation.

Results of Six Years Heavy Haulage (66308). Walter D. Hall. Ills. 3300 w. El JI—Dec., 1915. Single-phase electric traction, Grand Trunk Ry. system.

London and South Western Railway Electrification (66106 A). Ills. 12000 w. T & R W—Nov. 18, 1915. Conversion of suburban lines.

The Electrification of the Riksgränsen Railway and its Rolling-Stock (66689 A). Ills. 2000 w. Eng—Dec. 10, 1915. Serial, 1st part. General description.

The Electrification of Transportation Lines (67311). Norman Wilson Storer. 6500 w. El T—Jan., 1916. Read before Pan-Am. Sci. Cong. Reasons for electri-

fication, results accomplished, the problems, etc.

Possibilities of Steam Railroad Electrification (67493). William Arthur. Abstract of lecture at N. Y. University. 3500 w. R A G—Jan. 21, 1916. Reasons why electricity is gradually replacing steam.

Tentative Designs for Terminal Facilities in the Electrification of Chicago Railways (67297). Map and Ills. 2500 w. R R—Jan. 15, 1916. Changes necessary; extracted from committee's report of Chicago Assn. of Commerce.

Electric Traction on the Giovi Line (67325 A). Ills. 2400 w. El n—Dec. 31, 1915. Serial, 1st part. Information from foreign sources concerning results.

Electrification of the Manchester to Bury Section of the Lancashire & Yorkshire Railway (67661 A). Ills. 3500 w. El n—Jan. 14, 1916. Serial, 1st part. Details.

Operation on the Norfolk & Western Railway (67678 D). F. E. Wynne. Ills. 2500 w. A I E E, Pro—Feb., 1916. Advantages of electric service as proved in practice.

Unevaluated Factors in Electrified Railroad Operation (68437). Q. W. Hershey. 3000 w. El JI—March, 1916.

Neuere Schaltungen für elektrische Energierückgewinnung und Bremsung (68860 B). W. Wolf. Ills. 3500 w. E K u B—Feb. 24, 1916. Serial, 1st part. New system of connections for electric braking and regeneration.

An Outsider's Impressions of the Norfolk & Western Electrification (68435). T. C. Wurts. 2500 w. El JI—March, 1916. Interesting account.

Results of the Electrification of the St. Clair Tunnel (68598 A). Ills. 900 w. R & L E—March, 1916. From report of Walter D. Hall.

Torino-Pinerolo Electrification (69000). Ills. 1800 w. El T—March, 1916. Italian three-phase system.

High-Voltage D.-C. Railway Practise (69523 D). Clarence Ranshaw. 5500 w. A I E E, Pro—April, 1916. Apparent tendency.

Operation of the P. R. R. Philadelphia-Paoli Electrification (69390). F. G. Grimshaw. Ills. 2500 w. El R JI—April 8, 1916. Plans for eliminating difficulties.

Aus dem Betrieb der Riksgränsbahn (69631 B). F. Kuntze. Ills. 3500 w. E K u B—March 24, 1916. Operations of the Riksgränsen road.

Electric Operation on the C. M. & St. P. (69245). Ills. 1800 w. El Ry JI—April 1, 1916. Satisfactory results.

Consult Classification of the Index. See page 7.

Electrification

MOTIVE POWER AND EQUIPMENT

Engine Failures

Operation of the St. Paul Electrification (69929). Ills. 1500 w. R A G—April 28, 1916.

The Use of Continuous Current for Terminal and Trunk-Line Electrification (70436 N). Norman Wilson Storer, with discussion. Ills. 29 pp. I E E, JI—May 1, 1916. Characteristics and possibilities.

Electrification of Railroads (70559 A). W. F. M. Goss. Ills. 6000 w. W R C, Pro—Feb. 15, 1916. Chicago conditions as found by Assn. of Commerce.

Discussion on "Operation on the Norfolk and Western Railway" (Wynne), New York, Feb. 9, 1916 (70428 D). 5000 w. A I E E, Pro—May, 1916.

Die Elektrifizierung der Schweiz. Bundesbahnen (70184 B). 26 pp. Schweiz Elektro Ver Bul—Jan., 1916. General discussion of the problems involved in electrification of Swiss railways.

Zur Elektrisierung der Schweizerischen Bundesbahnen (70117 B). G. Soberski. 3500 w. E K U B—Apr. 14, 1916. General discussion of the electrification of the Swiss railways.

Gli studi per trazione elettrica in Svizzera (70111 B). Emilio Gerli. 4500 w. M T—Mar. 30, 1916. Serial, 1st part. Electric traction in Switzerland.

Neuere Studien über Schwankungen des Kraftbedarfs der elektrischen Zugförderung (70139 B). W. Kummer. Ills. 1800 w. S B—April 22, 1916. Serial, 1st part. Studies of variations in power demand.

Central Argentine Electrification (70840 A). Ills. 1500 w. El R—May 19, 1916. Important railway electrification scheme.

Electric Operation on the St. Paul (71150). A. H. Armstrong. Ills. 2000 w. El R JI—June 17, 1916. Simplicity of locomotive construction, etc.

North Eastern Railway Electrification (71410 A). Ills. 7500 w. T & R W—June 8, 1916. Equipment of the Shildon-Newport branch.

Operation on the Baltimore & Ohio Electrification (70969). Ills. 3000 w. El R JI—June 10, 1916. Detailed statistics.

The First Electrified Mineral Line in England (71001 A). Also editorial. Ills. 4000 w. R G—May 26, 1916. Serial, 1st part. The Shildon-Newport electrification, N.-E. Ry.

The Shildon-Newport Railway Electrification (70999 A). Ills. 1800 w. El n—May 26, 1916. Serial, 1st part. Equipment for freight haulage in England.

The Shildon-Newport Railway Electrification (70841 A). Ills. 1800 w. El R—May 26, 1916. Serial, 1st part. Application to a heavy freight line.

Sulla "questione del sistema" in materia di elettrificazioni ferroviarie (71332 B). Carlo Solari. 2600 w. M T—Apr. 30, 1916. Notes on the question of system for railway electrification.

Der elektrische Betrieb auf den Linien des Engadin (71334 B). H. Haueter. Ills. 1800 w. S B—May 13, 1916. Operation of the Engadine lines.

Discussion on "The Use of Continuous Current for Terminal and Trunk-Line Electrification" (71852 N). 2500 w. I E E, JI—June, 1916. N. W. Storer's paper.

Important Advance in Railway Electrification (71579 A). Ills. 1500 w. R & L E—July, 1916. The Chicago, Milwaukee & St. Paul Ry.

Operation of the St. Paul Electrification (71619). Ills. 1800 w. R A G—July 7, 1916. Electric locomotives thoroughly tested.

Der Energieverbrauch der elektrischen Traktion der Berner Alpenbahn (72122). L. Thormann. Ills. 5000 w. S B—July 8, 1916. Power requirements for electric traction on the Bernese Alps Railway.

Calcul graphique de la traction électrique (72108). J. Vichniak. Diagrams. 3300 w. I El—June 25, 1916. Graphic calculations of electric traction.

Discussion on "High-Voltage D.-C. Railway Practice (Renshaw) New York, April 14, 1916 (72386 D). 30 pp. A I E E, Pro—Aug., 1916.

Electric Traction on the Italian State Railways (72753 A). Ills. 2800 w. T & R W—Aug. 10, 1916. Details of lines.

Progress on the St. Gothard Electrification (72319). 2000 w. El R JI—Aug. 5, 1916. Why single-phase is considered best for this electrification.

The Electrification of the Swiss State Railways (72581 A). Julian Grande. 2200 w. Enr—Aug. 4, 1916. Swiss water power and its control, and the work of electrification now in progress.

Electrification on the Chicago, Milwaukee, and St. Paul Railway (73018 A). Ills. 2500 w. Enr—Aug. 18, 1916. Serial, 1st part. Review of this extensive undertaking.

Operation of Philadelphia-Paoli Electrification of the Pennsylvania Railroad (73670). W. H. Thompson and L. E. Frost. Ills. 2200 w. El JI—Oct., 1916. Advantages, performance, etc.

Steam Railroad Electrification (73891 A). W. H. Thompson. Ills. 3000 w. E C P, Pro—Oct., 1916. Views and outline of features of interest.

Engine Failures

Engine Failures, Their Causes and Cure (65587 A). J. E. Anderson. 1800

Consult Classification of the Index. See page 7.

Engine Houses

MOTIVE POWER AND EQUIPMENT

Fuel Inspectors

- w. Ry Age Gaz (Mech Ed)—Nov., 1915. Things conducive to engine failures. Analyzing Engine Failures (71750 A). A. Park. 2500 w. R M E—July, 1916. Importance of correct analysis.

Engine Houses

- Efficient Enginehouse Organization (68678 A). E. W. Smith. 3000 w. R M E—March, 1916. Prize article. For large terminals.

Exhausts

- Paper on Variable Exhausts (68242 N). J. Snowden Bell. Ills. 33 pp. Am Ry Mas Mech Assn—Vol. 48, 1915. Types, present status, with discussion. Road Tests of Exhaust Nozzles (68027 A). E. S. Barnum. Ills. 1000 w. R M E—Feb., 1916. Methods used by author.

Express Cars

- Northern Pacific Express Cars (70242 A). Ills. 800 w. R M E—May, 1916. Designed for perishable freight.

Feed Water

- Treatment of Feed Water for Locomotive Boilers (70830). L. F. Wilson. Read before Cincinnati Ry. Club. 4000 w. R R—June 3, 1916. External treatment, semi-internal, and internal treatment.

- Treating Feed Water for Locomotive Boilers (71803). L. F. Wilson. 2000 w. B M—July, 1916. Serial, 1st part. Read before Cin. Ry. Club. Methods of treatment.

- Water Treatment on the Missouri Pacific (71523). Ills. 1500 w. R A G—June 30, 1916. Results from softening plants.

Fireboxes

- Locomotive Firebox Proportions (72798 A). Lawford H. Fry. 1500 w. R M E—Aug., 1916. Firebox volume and method of measuring it.

Flat Wheels

- Relation of Slid Flat Wheels to Uniform Retardation (73693 A). W. V. Turner. 1500 w. R & L E—Oct., 1916. The role of the empty and load brake.

Freight Cars

- Freight Car Rehabilitation, Southern Railway (65573). Ills. 800 w. Ry Rev—Nov. 6, 1915. Adapting light capacity cars to resist severe shocks.

- Freight Car Construction, Maintenance and Abuse (67913). C. J. Wymer. Read before the Car Foremen's Assn. of Chicago. 2500 w. R R—Feb. 5, 1916. General treatment.

- The Life of a Steel Freight Car (67987 A). Samuel Lynn. Also discussion. Ills. 12000 w. R C P—Dec. 21, 1915. Care in maintenance.

- The Life of a Steel Freight Car (69408 A). Ills. 2000 w. R M M—April, 1916. Getting maximum service.

Fuel

- The Fuel Department—A Constructive Criticism (65854). L. G. Plant. Read before New England Ry. Club. 3500 w. Ry Age Gaz—Nov. 19, 1915. Factors upon which success depends.

- The Railroad Fuel Problem, Past and Present (70500). S. M. Felton. Address before Int. Ry. Fuel Assn. 2500 w. R R—May 20, 1916. Review of 30 or 40 years.

- Care of Locomotives with Relation to Fuel Economy (70625). A. N. Willsie. 2000 w. R A G—May 26, 1916. Read before Int. Ry. Fuel Assn. Necessity of maintaining locomotive. Suggestions.

- Fuel Economy and the Transportation Officer (70624). W. H. Averell. 4500 w. R A G—May 26, 1916. Read before Int. Ry. Fuel Assn. What officer can do.

- Coal Distribution Record System (70626). J. G. Crawford. Ills. 1200 w. R A G—May 26, 1916. System to insure used in order of billing.

Fuel Consumption

- How to Calculate Fuel Consumption in Figuring Economics of Railway Location (72838 N). John G. Sullivan. 21 tables. 1500 w. A R E A, Bul—July, 1916. Results of studies.

Fuel Economy

- Analysis of Dependent Sequence as a Guide to Fuel Economies (67783 N). Harrington Emerson. Ills. 45 pp. Int Ry Fuel Assn Pro—1915. Cumulative effects of wastes; with extended discussion.

- Report of Committee on Fuel Economy (68241 N). Ills. 35 pp. Am Ry Mas Mech Assn—Vol. 48, 1915. Essentials; with discussion.

- Waste of Fuel in Railway Stationary Plants and Locomotives (67789 N). Jos. W. Hays. 24 pp. Int Ry Fuel Assn Pro—1915. Analysis of causes and means of prevention; with discussion.

- Fuel Economy (68504 A). H. C. Woodbridge. Also discussion. 8000 w. R C P, Pro—Jan. 28, 1916.

- Report of Committee on Fuel Economy and Smoke Prevention (71881 N). 9 pp. A R M M A—May 10, 1916. Means of applying rules.

- Care of Locomotives with Relation to Fuel Economy (73494 A). A. N. Willsie. 3500 w. Mch E—Sept. 15, 1916. Suggestions for securing efficiency at least cost for labor, etc.

- Locomotive Fuel Economy and Boiler Design (74027). J. T. Anthony. 5000 w. R A G—Oct. 20, 1916. Suggestions for improving practice.

Fuel Inspectors

- Functions of a Railroad Fuel Inspector (70467). Eugene McAuliffe. Read be-

Consult Classification of the Index. See page 7.

Gondola Cars**MOTIVE POWER AND EQUIPMENT****Locomotive Design**

fore Int. Ry. Fuel Assn. 2000 w. R A G
—May 19, 1916. Duties.

Gondola Cars

Extensive Equipment of Steel Gondola Cars for the Imperial Russian Government Railways (66178 A). Ills. 1500 w. R & L E—Dec., 1915. Built at McKee's Rocks.

Handling Equipment

The Promotion of the Proper Handling of Equipment (66464 A). E. E. Betts. Also discussion. 1400 w. W R C—Sept. 21, 1915. Car service rules and recommendations for revision.

Headlights

Report of Committee on Locomotive Headlights (68237 N). Ills. 30 pp. Am Ry Mas Mech Assn—Vol. 48, 1915. Data collected; with discussion.

Meeting the Federal Headlight Requirements (72275). L. C. Porter. Ills. 2500 w. R A G—Aug. 4, 1916. Incandescent electric equipment.

Hospital Train

Hospital Train for the United States Army (72945). Ills. 700 w. R R—Sept. 2, 1916. Train of ten cars for Mexican border.

Impact

Locomotive Impact Tests on the Burlington (70337). C. B. Young. Ills. 1800 w. R A G—May 12, 1916. Study of benefits to bridges and track by use of light reciprocating parts.

Indicator Diagrams

Locomotive Indicator Diagrams (71695). M. C. M. Hatch. Ills. 1200 w. Pwr—July 11, 1916. Interesting figures and diagrams obtained from tests.

Industrial Locomotives

Baldwin Locomotive Works Industrial Locomotives for the Worth Brothers Co., and the Youngstown Sheet and Tube Co. (69300 A). Ills. 700 w. R & L E—April, 1916. Detailed descriptions of machines.

Injectors

Report of Committee on Flange and Screw Couplings for Injectors (68247 N). Ills. 18 pp. Am Ry Mas Mech Assn—Vol. 48, 1915. Recommendations; with discussion.

Inspection

Locomotive Inspection Laws and Rules (71186 A). Frank McManamy, with discussion. 25 pp. R C P, Pro—April 28, 1916. The purpose and methods of enforcement, etc.

A Locomotive Inspection System (71751 A). N. M. Barker. 2500 w. R M E—July, 1916. Designed to produce thoroughness.

Instruction Cars

A South American Railway Instruction Car (66556 A). Ills. 1000 w. Enr—Dec. 3, 1915. For Central Argentine Ry. Co.

Internal-Combustion Locomotives

An Internal-Combustion Locomotive for Working on Steep Inclines (65915 A). Ills. 1800 w. Ry Gaz, Lond—Nov. 12, 1915. Details of the Fell Triple-rail system.

Locomotive Boilers

Report of Committee on Design Construction and Maintenance of Locomotive Boilers (68238 N). 15 pp. Am Ry Mas Mech Assn—Vol. 48, 1915; with discussion.

Report of Committee on Boiler Washing (68246 N). Ills. 30 pp. Am Ry Mas Mech Assn—Vol. 48, 1915. Good practice; with discussion.

Report of Committee on Design and Maintenance of Locomotive Boilers (71894 N). 2500 w. A R M M A—April 15, 1916. Features of interest, and modern practice.

Locomotive Construction

Bemerkungen über den Zusammenbau der Lokomotiven (66216 B). Fr. Landsberg. Ills. 6000 w. G A G B—Nov. 15, 1915. Notes on methods of assembling locomotives.

Locomotive Cranes

Locomotive Cranes (68063 D). Ills. 7500 w. Am Ry Brdg & Bldg Assn—Oct., 1915. Report of committee, with appendix and discussion.

Locomotive Design

Mikado Versus Consolidation Locomotives (65852). N. D. Ballantine. 3000 w. Ry Age Gaz—Nov. 19, 1915. Economical distribution of power from a net revenue standpoint.

Gegengewichtsberechnung einer Dreizylinder-Lokomotive mit um 120° versetzten Kurbeln (65439 B). E. Najork. Ills. 1500 w. Gla Ann—Oct. 15, 1915. Method of calculating position and weight of counterweights for three-cylinder, 120-degree-crank locomotive.

Operation of Parallel and Radial Axles of a Locomotive by a Single Set of Cylinders (66563 N). Anatole Mallet. Ills. 5000 w. A S M E—Dec., 1915. Examination of many arrangements proposed.

Lokomotiven und Wagen mit Triebdrehgestellen (67766 B). Hermann Liechty. Ills. 1500 w. G A G B—Jan., 1916. Serial, 1st part. Development of driving trucks for locomotives.

Operation for Parallel and Radial Axles of a Locomotive by a Single Set of Cylinders (67869 A). Anatole Mallet.

Consult Classification of the Index. See page 7.

Locomotive Economy MOTIVE POWER AND EQUIPMENT Locomotive Equipment

Also discussion. Ills. 9000 w. A S M E, JI—Feb., 1916.

Metallsparsnis und Ersatzbaustoffe im Lokomotivbau. (68872 B). Höfinghoff. 2500 w. G A G B—Mar. 1, 1916. Economies in material and use of substitutes in locomotive building.

Nieuwe sneltreinlocomotiven der H. IJ. S. M. (69632 B). W. Hupkes. Ills. 5000 w. Ing—March 18, 1916. Design and operation of new Dutch express locomotives.

Advantages of the Brick Arch in Modern Locomotives (69302 A). Ills. 2000 w. R & L E—April, 1916. Construction and repairs.

Reduction of Dynamic Augment (70249). 3000 w. R R—May 6, 1916. Practical results of refined design and use of improved materials.

The Garratt Locomotive (70522 A). From a paper by H. W. Dearberg, read before Inst. of Locomotive Engrs. 2500 w. R G—May 5, 1916. Flexible type.

The Simplex System of Compounding for Mallet Locomotives (70004). Ills. 1500 w. R R—April 29, 1916. Improved intercepting valve.

Report of Committee on the Best Design and Materials for Pistons, Valves, Rings, and Bushings (71884 N). Ills. 20 pp. A R M M A—May 1, 1916. Based on replies from 34 railroads.

Report of Committee on Revision of Standards and Recommended Practice (71882 N). 5 pp. A R M M A—May 20, 1916. On journal boxes, bearings, wheels, etc.

Locomotive Economy

Locomotive Water and Coal Consumption (68028 A). Harold A. Huston. 2000 w. R M E—Feb., 1916. Methods for calculating.

Report of Committee on Front Ends, Grates and Ash Pans (67792 N). Ills. 28 pp. Int Ry Fuel Assn, Pro—1915. With discussion.

Locomotive Equipment

Locomotives Ordered in America for Foreign Countries (65955). Ills. 1500 w. Ry Age Gaz—Nov. 26, 1915. Engines built for Greece, Serbia, Russia, and Belgium.

New Six-Wheeled Type of Switching Locomotives for the Chicago Great Western Railroad, and the Public Belt Railroad Commission of New Orleans (65386 A). Ills. 800 w. Ry & Loc Engng—Nov., 1915. Detailed descriptions.

First 4-8-2 Locomotives in Canada (65584 A). W. H. Winterrowd. Ills. 2500 w. Ry Age Gaz (Mech Ed)—Nov., 1915. Trucks equalized with drivers.

Eight-Wheels Coupled Engines on British Railways (65923 A). E. L. Ahrons. 3000 w. Engr, Lond—Nov. 12, 1915. Changed conditions, with description of recent engines and their performance.

New 2-6-0 Type Locomotive for the Glasgow South-Western Railway (65776 A). Ills. 250 w. Ry Gaz, Lond—Nov. 5, 1915. Detailed description.

Baldwin Locomotives for C. B. & Q. (66801 A). Ills. 2000 w. R M M—Dec., 1915.

Converted Atlantic Type Locomotive—Great Northern Railway (66071A). Ills. 300 w. R G—Nov. 19, 1915.

Heavy Pacific Type Locomotive for the Lackawanna (66759). Ills. 800 w. R A G—Dec. 24, 1915.

A Pair of British Old-Timers (66982 A). Ills. 500 w. R & L E—Jan., 1916. Particulars of engines built in 1853-54.

Pacific Type of Locomotive for the Delaware, Lackawanna & Western Railroad (66983 A). Ills. 1500 w. R & L E—Jan., 1916. Dimensions and description.

Powerful Mikado Type of Locomotive for the Missouri, Oklahoma and Gulf Railway (66981 A). Ills. 800 w. R & L E—Jan., 1916. Detailed description.

Two Powerful 4-6-2 Locomotives (67272 A). Ills. 1500 w. R M E—Jan., 1916. One burns anthracite, the other bituminous. Data and dimensions.

American-Built Locomotives for Beligerent Countries (68081 A). Ills. 700 w. R G—Jan. 28, 1916. Built for Serbia, Belgium and Russia.

Four-Cylinder "Atlantic" Type Locomotive—Great Northern Railway (68263 A). Ills. & Plate. 400 w. R G—Feb. 4, 1916. Converted from 2-cylinder.

The Ritchie Locomotive (67670 A). 1200 w. Enr—Jan. 14, 1916. Early design; progress.

Mallet Compound Locomotives for the South African Railways (67912). F. C. Coleman. Ills. 500 w. R R—Feb. 5, 1916. British built engine.

Remarkable Locomotives of 1915 (69163 A). J. E. Gairns. Ills. 8500 w. C E M—March, 1916. General practice and details.

4-8-0 Type Engines for the Central Africa Railway (68624 A). Ills. 500 w. R G—Feb. 18, 1916. Description.

Anfahrvorrichtungen für Lokomotiven (68874 B). O. Hoppe. Ills. 3000 w. G A G B—Mar. 1, 1916. Starting gears for locomotives.

Recent Examples of 2-10-2 Type Locomotives (69780). Ills. 1800 w. R A G—April 21, 1916. Lateral motion on leading axles.

Locomotive Inspection MOTIVE POWER AND EQUIPMENT**Locomotives**

The "Director" Class Superheated Express Locomotives. Great Central Railway (69582 A). Ills. and Plate. 1500 w. R G—March 24, 1916. Details of 4-4-0 type.

Norfolk & Western Mountain Type Locomotives (69358). Ills. 1000 w. R A G—April 7, 1916. Details and comparison with similar types.

2-6-2 Tank Locomotives, Assam-Bengal Railway (70443 A). Ills. 300 w. R G—April 26, 1916. Detailed description.

Locomotives of the Santa Fé Type (70239 A). Ills. 1200 w. R M E—May, 1916. Engines with lateral motion front driving boxes.

Mikado Type Locomotives for the Raritan River Railroad, and Mikado Locomotives for the Lehigh & Hudson River Railway (70066 A). Ills. 1800 w. R & L E—May, 1916. Details.

Marked Improvements on 2-10-2 Type Locomotives for the New York, Ontario & Western, and the Erie (70062 A). Ills. 1000 w. R & L E—May, 1916. Particulars and dimensions.

Mallet Locomotives for the N. C. & St. L. (70059). Ills. 1500 w. R A G—May 5, 1916. Pusher service on 2 per cent. grade.

Locomotive Inspection

Locomotive Inspection (66448 A). Frank McManamy. Also discussion. 9500 w. S & S-W R C, Pro—Nov., 1915. Requirements of boiler inspection rules.

Locomotive Inspection Laws (70560 A). Frank McManamy, with discussion. 25 pp. W R C, Pro—March 21, 1916. Rules apt to be misunderstood.

Locomotive Operation

The Value of a Freight Locomotive from a Transportation Standpoint (65653 A). N. D. Ballantine. Also discussion. 33 pp. W Ry Club, Pro—April 20, 1915. Analytical study.

Locomotive Performance

Performance of Converted Locomotives on the Kansas City Southern Ry. (70973). Ills. 500 w. R R—June 10, 1916. Tests to determine advantages gained in changing saturated steam locomotives to superheaters.

Test of Locomotives (71353 A). D. R. MacBain, with discussion. Ills. 10000 w. W R C, Pro—April 18, 1916. Expansion and contraction of the fire box and boilers.

Great-Western Runs to Birmingham (71646 A). 3000 w. Enr—June 16, 1916. Heavy gradients and high average speed.

Recent Locomotive Working on the Paris-Lyons and Mediterranean Railway (71868 A). 3500 w. R E—July, 1916.

Locomotive Repairs

2-6-0 Mogul Type of Locomotive for General Switching Service on the Newburgh and South Shore Railway (66175 A). Ills. 700 w. R & L E—Dec., 1915.

Powerful Pacific Type Locomotive for the R. F. & P. (66583). Ills. 800 w. R A G—Dec. 17, 1915. Exceeds all previous Pacific type engines in tractive effort.

See, also Welding, under MECHANICAL ENGINEERING, *Machine Works and Foundries*.

Locomotives

The Future of the Steam Locomotive (67185). John E. Muhlfeld. 3000 w. R R—Jan. 8, 1916. Conclusion that it will remain standard unit of motive power.

Express Locomotives in France (70240 A). Edouard Sauvage. Ills. 1800 w. R M E—May, 1916. Six-coupled engines of 4-cylinder compound type.

Consolidation Locomotives for the Lake Superior & Ishpeming Ry. (70363). Ills. 700 w. R R—May 13, 1916. For heavy grades and sharp curves.

Large Locomotives of the Consolidation Type (71100). Ills. 700 w. R A G—June 16, 1916. Engines for ore traffic on the Lake Superior & Ishpeming R. R.

Report of Committee on Equalization of Long Locomotives (71883 N). Ills. 8 pp. A R M M A—May 1, 1916. Review of development.

Report of Committee on Modernizing of Existing Locomotives (71890 N). Ills. 45 pp. A R M M A—April 21, 1916. Abstract of replies to a circular of inquiry.

Large Consolidation Locomotive (71747 A). Ills. 700 w. R M E—July, 1916. For use in ore traffic on the L. Superior & Ishpeming.

Mallet Articulated Locomotives for the Baltimore & Ohio R. R. (71691). Ills. 1100 w. R R—July 8, 1916. Design intended for heavy road service.

Mallet Compound Locomotives for the Western Maryland Ry. (72083). Ills. 1200 w. R R—July 29, 1916. Describes leading features.

Mallet Locomotives for Use in Road Service (72063). Ills. 1100 w. R A G—July 28, 1916. B. & O. engines for use on ruling grades over 2 per cent.

Mikado Type Locomotives for the Atchison, Topeka & Santa Fe Ry. (70829). Ills. 1200 w. R R—June 3, 1916. Revised design.

New 0-6-2 Type Tank Engines—Glasgow & South Western Railway (70846 A). 300 w. R G—May 19, 1916. Photograph, sectional drawing, and particulars.

Consult Classification of the Index. See page 7.

Locomotives

MOTIVE POWER AND EQUIPMENT

Locomotives

Recent 2-8-2 Type Locomotives Constructed at the Baldwin Locomotive Works (72155 A). Ills. 1800 w. R G—July 14, 1916. Three designs of recently built Mikado engines, showing United States practice.

Pacific Type Express Locomotives—South African Railways (71839 A). Ills. 500 w. R G—June 30, 1916. 4-6-2 type, designed for heavy fast passenger service.

Pacific Type Locomotives for the Reading (71949). Ills. 700 w. R A G—July 21, 1916. Designed to haul heavy passenger trains in fast service.

Santa Fe Type Locomotives for the Erie Railroad (70974). Ills. 1800 w. R R—June 10, 1916. Two recent types.

South African Railways' Locomotives (71172 A). Ills. 500 w. R G—June 9, 1916. Serial, 1st part. Built in America.

Triplex Articulated Compound Locomotives for the Erie R. R. (71993). Ills. 800 w. R R—July 22, 1916. Leading features and description.

Triplex Articulated Locomotives for the Erie (71789). Ills. 800 w. R A G—July 14, 1916. Improvements introduced and principal dimensions and data.

Baltimore & Ohio Road Mallets (72497 A). Ills. 1200 w. R M E—Aug., 1916. Locomotives of 2-8-8-0 type, for grades over two per cent.

British-Built Engines for the French State Railways (72578 A). Ills. and Plate. 800 w. Enr—Aug. 4, 1916. Particulars of an express passenger and a goods locomotive.

Care of Locomotives With Relation to Fuel Economy (72339). A. N. Willsie. 3500 w. R R—Aug. 5, 1916. Shows that every neglect affects the cost of fuel.

De ontwikkeling van het Locomotiefpark der Maatschappij tot Exploitatie van Staatsspoorwegen (72816 B). F. Westendorp. Ills. 7100 w. Ing—Aug. 5, 1916. Development of Dutch locomotives, with particulars of dimensions, weight, etc.

Eight - Wheel English Locomotive (72500 A). Ills. 1500 w. R M E—Aug., 1916. For fast passenger service.

Express Passenger and Goods Locomotives for the French State Railways (72540 A). Ills. 1500 w. Eng—July 28, 1916. Interesting examples of French practice.

Four Cylinder 4-6-0 Express Engine, Great Southern and Western Railway of Ireland (72522 A). Ills. 700 w. R E—Aug., 1916. Particulars, dimensions, etc.

Gasoline Switching Locomotive for the Erie (72439). Ills. 300 w. R A G—Aug. 11, 1916. Brief description.

High Powered Locomotives on the Pennsylvania Railroad (72575 A). Ills. 500 w. Eng—Aug. 4, 1916. Serial, 1st part. Particulars of the K4S, the LIS, and the E6S types.

North Western Pulverized Coal Locomotive (72437). Ills. 2500 w. R A G—Aug. 11, 1916. Standard high-speed Atlantic type.

Development of the Locomotive (72980 A). Angus Sinclair. 2000 w. R & L E—Sept., 1916. Address to apprentices of Erie R. R.

Garratt Type Locomotives for Brazil (73048 A). Ills. 600 w. R M E—Sept., 1916. Built in England for service on the San Paulo Ry.

Mallet Locomotives for the Baltimore and Ohio Railway, and for the Nashville, Chattanooga and St. Louis Railway (73103 A). Ills. 2200 w. Eng—Aug. 25, 1916. Details of two designs.

Narrow Gauge Locomotive for the East Broad Top Railroad and Coal Company (72979 A). Ills. 600 w. R & L E—Sept., 1916. Detailed description.

New Express Passenger and Goods Locomotives for the French State Railways (73001 A). Ills. 1200 w. R G—Aug. 18, 1916. Constructed by the North British Locomotive Co., Ltd. Particulars of powerful engines.

New 2-10-2 Type Locomotives (73237 A). Ills. 1500 w. R G—Sept. 1, 1916. Details of engines for the N. Y., O. & W. and the Erie R. Rs.

Recent Baldwin Locomotives for Export (73208). Ills. 700 w. R A G—Sept. 15, 1916. For Jamaica and China.

Sizes of Valves in Modern Existing Locomotives (72978 A). Ills. 800 w. R & L E—Sept., 1916. Results of tests.

The Baldwin Locomotive Works—Deauville Type Locomotives for Light Service (73344). Ills. E & C—Sept. 20, 1916. Details of engine for industrial or contractor's service.

American Type Two-Cylinder Locomotives on the Eastern Railway of France (73951 A). Ills. 2800 w. R E—Oct., 1916. Details of types in new designs.

British Built Passenger Locomotives for French State Railways (73843 A). Ills. & plate. 2000 w. Enr—Sept. 29, 1916. Drawings and particulars of engines of Pacific type, employing superheated steam.

Four-Cylinder Atlantic Type Locomotives, Great Northern of England (73808 A). Ills. 300 w. R M E—Oct., 1916. Description and particulars.

Four Cylinder 4-8-0 Type Locomotive, Norwegian State Railways (73839 A).

Consult Classification of the Index. See page 7.

Locomotive Testing

Ills. & plate. 500 w. R G—Sept. 29, 1916. Detailed description.

Heavy Freight Locomotives, Duluth, Missabe & Northern Ry. (73799). Ills. 1000 w. R R—Oct. 7, 1916. Improvements in detail and equipment.

Steam Storage Locomotives (73706 A). Ills. 400 w. Enr—Sept. 15, 1916. Two recent Baldwin types.

Locomotive Testing

Laboratory Tests of a Consolidation Locomotive (66641 N). E. C. Schmidt, J. M. Snodgrass, and R. B. Keller. Ills. 125 pp. U I, Bul 82—Sept. 13, 1915. Tests to determine general performance and after repairs.

Locomotive Testing Plant, Iowa State College (66165). Ills. 700 w. R R—Dec. 4, 1915. Plant with latest apparatus.

Laboratory Test of Baldwin 2-8-0 for Illinois Central (67970 A). Ills. 1200 w. R M M—Feb., 1916. Tests after overhauling.

Tests of a Mountain Type Locomotive (67233 A). W. J. Tollerton. Ills. 1200 w. R G—Dec. 24, 1915. Chicago, Rock Island & Pacific tests.

Tests of a Consolidation Type Locomotive (68672). 2000 w. R A G—March 10, 1916. At Univ. of Ill.

Locomotive Tires

The Strength and Wear of Locomotive Tires (70855 A). E. L. Ahrons. 2500 w. Enr—May 19, 1916. Serial, 1st part. Attempts to obtain a proportionate figure for the wear of tires.

Lubrication

Graphite in Locomotive Valve Chambers and Cylinders (68674 A). M. C. M. Hatch. 1500 w. R M E—March, 1916. Results obtained.

Lubricator for Locomotive Air Pumps (71103). Ills. 800 w. R A G—June 16, 1916. Designed by O. C. Wright.

Materials

See same heading under *Permanent Way and Buildings*.

M. C. B. Rules

Annual Report of Standing Committee on Revision of M. C. B. Rules of Interchange (70831 A). 45 pp. R C P, Pro—March 24, 1916. Recommended changes.

Motor Cars

The Value of Motor Cars on Railroad Systems (65751 A). W. R. McKeen. Also discussion. 10800 w. N Y R R Club, Pro—Oct. 15, 1915. On branch lines.

The Thomas Transmission Loco-coach (66773 A). Ills. 2500 w. T & R W—Dec. 9, 1915. Details of design.

Elektromotor-Triebwagen mit eigener Kraftquelle (72799 B). Ills. 2000 w.

MOTIVE POWER AND EQUIPMENT**Pneumatic Devices**

S B—July 15, 1916. Serial, 1st part. A railway motor passenger car driven by electric motors operated by a 200 h.p. Diesel engine, built by Sulzer Brothers, at the Winterthur works.

Motor Vehicles

Commercial Motor Vehicles for Railway and Industrial Purposes (69314 A). Ills. 3000 w. R G—March 17, 1916. Leland motors (1914) Ltd.

Commercial Motor Vehicles for Railway and Industrial Purposes (70020 A). Ills. 1200 w. R G—April 14, 1916. Design and construction of Daimler vehicles.

Moving-Picture Car

Moving Picture Car to Promote Safety on the N. Y. C. Lines (67968 A). Ills. 1200 w. R M M—Feb., 1916. To show dangers of careless practices chiefly on part of employees.

Oil-Fired Locomotives

Fuel Oil Installations and Equipment, Florida East Coast Ry. (71291). Ills. 1500 w. R R—June 24, 1916. Recent change from coal to oil as locomotive fuel.

Some Small American Petrol Locomotives (71183 A). Ills. 800 w. Enr—June 9, 1916. Types.

Oil Fuel

Fuel Oil for Locomotive Use (67788 N). G. M. Bean. Ills. 20 pp. Int. Ry. Fuel Assn, Pro—1915. Methods of use; with discussion.

British Oil Locomotives (72162 A). Ills. 1200 w. Enr—July 14, 1916. Detailed description of industrial locomotives and their uses.

Passenger Cars

New Carriages for Royal Siamese State Railways: Southern Line, Metre Gauge (66320 A). Ills. 1000 w. R G—Nov. 26, 1915. Dimensions and general design.

Steel Cars for Michigan Railway (66397). Ills. 3000 w. El R JI—Dec. 11, 1915.

Improvement in Passenger Car Construction and Design (69243). K. F. Nystrom. Read before Can. Ry. Club. Ills. 2500 w. R R—April 1, 1916. Favors the composite type of steel and wood.

Suburban Coaches for the Grand Trunk Ry. (69242). James Coleman. Ills. 1000 w. R R—April 1, 1916. Steel underframe and composite superstructure used.

Pneumatic Devices

Pneumatically Operated Devices on Locomotives and Cars (73666). F. M. Nellis. 1800 w. El JI—Oct., 1916. Resumé of applications in railway service.

Consult Classification of the Index. See page 7.

P. S. Brake**MOTIVE POWER AND EQUIPMENT****Standards****P. S. Brake**

Electric Operation of the New York P. S. Brake Equipment (72977 A). Ills. 800 w. R & L E—Sept., 1916. Explanation.

Pulverized Fuel

Powdered Coal (67782 N). W. L. Robinson. 57 pp. Int Ry Fuel Assn, Pro—1915. Use on locomotives; with extended discussion.

Pulverized Fuel for Locomotive Service (68378). J. E. Muhlfeld. Ills. 4500 w. R A G—Feb. 25, 1916. Equipment used.

Pulverized Fuel for Locomotives (68953 A). John E. Muhlfeld. Ills. 24 pp. N Y R C, Pro—Feb. 18, 1916. Advantages. Discussion.

Pulverized Fuel for Locomotives (73753 A). J. E. Muhlfeld. Ills. 3500 w. R G—Sept. 22, 1916. Locomotive designed for its use. Its advantages.

Rack Railways

Notes on the Working of a Rack Railway (73152 N). William Theodore Lucy, with abstract of discussion. 55 pp. I C E, Paper No. 4152—1916. Information as to practical details on the Chilian Trans-andine Ry.

Rail Contacts

Het gebruik van pedalen en geïsoleerde rails (71339 B). C. J. G. W. Koopman. Ills. 7000 w. Ing—May 27, 1916. The use of rail contacts in insulated rails.

Refrigerator Cars

Refrigerator Cars for the Santa Fe (68192). Ills. 1200 w. R A G—Feb. 18, 1916. Design and special features of equipment.

Moore Type Refrigerator and Heater Car (68943). Ills. 1000 w. R A G—March 17, 1916. Detailed description.

Santa Fe Refrigerator Cars (68677 A). Ills. 1000 w. R M E—March, 1916. Special features.

Refrigerator Cars for the Santa Fe (73447 A). Ills. 1000 w. R G—Sept. 8, 1916. Detailed description.

Repairs

Freight Car Repairs on the Boston and Maine Railroad (68647 A). Ills. 1800 w. R M M—March, 1916. Facilities, methods and organization.

Reversing Gears

Locomotive Reversing Gears (67411 A). From *The Locomotive*. Ills. 1500 w. Mch W—Jan. 7, 1916. Designs and action.

Review of 1915

Cars and Locomotives Ordered and Built in 1915 (66844). Also editorial. 6000 w. R A G—Dec. 31, 1915. Extension of all-steel equipment, foreign orders during last quarter.

Sanitation

The Sanitation of Railway Cars (70316 A). Thomas R. Crowder, with discussion. 13000 w. N Y R C, Pro—April 21, 1916. Danger of diseases; heating, lighting, hygiene, etc.

Scrap

Unique Way of Handling Railroad Scrap (69476 A). F. L. Prentiss. Ills. 1500 w. I A—April 13, 1916. Gravity distributing dock of the New York Central.

Scrap Handling

Scrap and Reclamation on the Pennsylvania Lines East (70250). Ills. 3000 w. R R—May 6, 1916. Methods of accounting for material.

Scrap Reclamation

Chesapeake & Ohio Scrap Reclamation (68680 A). H. M. Brown. Ills. 2500 w. R M E—March, 1916. Savings effected.

Shop Practice

Reclaiming Material at Local Shops (66184 A). E. A. Murray. Ills. 1800 w. R A G, M E—Dec., 1915. Salvaging of scrap.

Superior Methods of Reclamation, Buffalo, Rochester, and Pittsburgh Ry. (66392). Ills. 1200 w. R R—Dec. 11, 1915.

Electricity for the Railway Mechanic (69413 A). J. H. Wickman. Ills. 1800 w. R M M—April, 1916. Suggestions for maintenance.

Shops

North Billerica Locomotive Machine Shop—Boston and Maine Railroad (66030 A). Ills. 6000 w. Ry Mas Mech—Nov., 1915. Details showing modern tendencies in construction of railroad shops.

Smoke Abatement

Smoke Abatement and Electrification of Railway Terminals in Chicago (71896 B). W. F. M. Goss, with discussion. Ills. 34 pp. W S E, J1—April, 1916. Summarized statement of address, showing serious difficulties and impracticability of the scheme.

Smoke Prevention

Smoke Prevention (67785 N). E. W. Pratt. Ills. 21 pp. Int Ry Fuel Assn, Pro—1915. Possibilities and methods; with discussion.

Report of Committee on Smoke Prevention (68236 N). 10 pp. Am Ry Mas Mech Assn—Vol. 48, 1915. Instructions; with discussion.

Standards

Report of Committee on Revision of Standards and Recommended Practice (68234 N). Ills. 29 pp. Am Ry Mas Mech Assn—Vol. 48, 1915. Recommendations; with discussion.

Steam Shovels

MOTIVE POWER AND EQUIPMENT

Train Lighting

Steam Shovels

Steam Shovels and Locomotive Cranes (69787). L. K. Silcox. 1800 w. R A G—April 21, 1916. Maintenance and operation in railway service.

Steel Cars

Canadian Northern Steel Frame Passenger Cars (67848). Ills. 2000 w. R A G—Feb. 4, 1916. Steel underframes and body frames with wood finish.

Life and Maintenance of Steel Cars (68676 A). M. K. Barnum. Ills. 4000 w. R M E—March, 1916. General considerations.

An All-Steel Train for the Great Indian Peninsula Railway (68799 A). Ills. 600 w. R G—Feb. 25, 1916. General description.

Stokers

Relation of Mechanical Stokers to the Fuel Problem (67787 N). Ills. 40 pp. Int Ry Fuel Assn Pro—1915. Committee report; with discussion.

Report of Committee on Locomotive Stokers (68233 N). 27 pp. Am Ry Mas Mech Assn—Vol. 48, 1915. Types; with discussion.

Report of Standing Committee on Mechanical Stokers (71892 N). 1000 w. A R M M A—April 15, 1916. Headway made in stoker designs and improvements.

Storekeeping

Railroading from a General Storekeeper's Point of View (67699 N). J. G. Stuart. Also discussion. 13000 w. W R C, Pro—Oct. 19, 1915. Possible improvements.

Stress Analysis

Buffing Stresses in Box Cars (72502 A). Robert N. Miller. Ills. 1500 w. R M E—Aug., 1916. Serial, 1st part. Stress analysis the horizontal effect of inertia upon body frame members.

Superheaters

Superheater for Locomotive Boilers Having Small Flue Tubes (66321 A). Ills. 1200 w. R G—Nov. 26, 1915. Designed by J. G. Robinson. Details of the "Side-Header" superheater.

Report of Committee on Superheater Locomotives (68240 N). Ills. 77 pp. Am Ry Mas Mech Assn—Vol. 48, 1915. Tests of class E 6s passenger locomotive, by P. R. R.

The Modern Superheater and Its Performance (71310 A). S. S. Riegel, with discussion. 32 pp. Ills. C R C—May, 1916. Adaptations and operation.

Locomotive Superheater Performance (71746 A). S. S. Riegel, with discussion. 5000 w. R M E—July, 1916. Present practice and probable results of higher degree of superheat.

Report of the Committee on Superheated Locomotives (71891 N). 5 pp. A R M M A—April 15, 1916. Economics effected, best method of repairing, etc.

Method of Attaching the Ends of Superheater Flues to the Header of the Robinson Superheater (72239 A). Frank Page. 1200 w. R & L E—Aug., 1916. Explanation.

Superheater Performance on Locomotives (73692 A). 1500 w. R & L E—Oct., 1916. Economics resulting from superheating. Result of test on N. Y., O. & W. Ry.

Superheating

Important Improvements in Superheater Appliances. Relative Values of Saturated and Superheated Steam (70065 A). Ills. 2000 w. R & L E—May, 1916. Economy in highly superheated steam.

Terminals

Passenger Terminal Inspection (70241 A). R. S. Mounce. First prize article. 2200 w. R M E—May, 1916. Relation of car department to terminals. Handling a Big Engine Terminal (72503 A). Harvey De Witt Wilcomb. 1800 w. R M E—Aug., 1916. Organization of roundhouse forces.

Test Cars

New United States Bureau of Standards' Test Car, Built by the Pennsylvania Railroad Company (65387 A). Ills. 1200 w. Ry & Loc Engng—Nov., 1915. Test Weight Car No. 2 is described.

Long and Short Wheel Base Test Cars (69784). C. A. Briggs. Ills. 2500 w. R A G—April 21, 1916. Influence on scale-testing equipment.

Tinware

Report of Committee on Standardization of Tinware (68239 N). Ills. 28 pp. Am Ry Mas Mech Assn—Vol. 48, 1915. Notes, with prints covering details.

Tires

Le Chauffage Électrique Des Bandages De Roues (72801 B). Ills. 1400 w. I E I May 25, 1916. Description of an electrical apparatus for heating car and locomotive tires in use in a Swiss establishment.

Train Lighting

Report of the Committee on Train Lighting (68361 N). Ills. 20 pp. Mas Car Bldrs' Assn, Pro—Vol. 49, 1915. With discussion.

Nouveaux appareils pour l'éclairage électrique des trains (70141 B). Ills. 2000 w. Ind Elec—Apr. 25, 1916. Arrangement of apparatus for train lighting.

Verlichting an spoorweggruijgen door middel van acetyleen-gloeilicht (70181 B). G. H. Loffmann. Ills. 4500 w. Ing—

Consult Classification of the Index. See page 7.

Trains

Apr. 15, 1916. Methods of lighting trains by acetylene.

Report of Committee on Train Lighting and Equipment (71880 N). Ills. 20 pp. M C B A—April 15, 1916. Present and proposed practices.

Trains

New Corridor Train for the Darjeeling and Assam Mail Service (69124 A). Ills. 700 w. R G—March 10, 1916.

Trucks

Four-Wheel Trucks for Passenger Cars (66571 N). Roy V. Wright. Ills. 2500 w. A S M E—Dec., 1915. Discussion of characteristics.

Four-Wheel Trucks for Passenger Train Coaches (72526 A). Roy V. Wright. Ills. 2000 w. R G—July 28, 1916. Used on Penn. R. R.

Valve Gears

Verbesserte Schwingensteuerung für Lokomotiven, Patent Lindner (65981 B). R. Klien. Ills. 800 w. Schw Bau—Nov. 6, 1915. New locomotive valve gear, Lindner patent.

Equalizing Cut-offs in Walschaert Valve Gears (66803 A). E. O. Waters. Diagrams. 2500 w. R M M—Dec., 1915. Method.

Simple Method of Adjusting the Walschaerts Valve Gear (66980 A). Clarence Bodemer. 700 w. R & L E—Jan., 1916. Details of method.

Effect of Valve-gear on Locomotive Operation (68908 A). W. E. Preston.

PERMANENT WAY AND BUILDINGS**Coaling Stations**

From paper before Trav. Engrs. Con. 1500 w. Mch W—Feb. 25, 1916. Disclosed by indicator cards.

Important Details in Adjusting the Walschaerts and Baker Valve Gears (68596 A). E. C. Goetze. Ills. 700 w. R & L E—March, 1916.

Test of the Young Valve and Valve Gear (69359). Ills. 1000 w. R A G—April 7, 1916. Tests on Pacific type locomotives.

Water Service

Comparative Water Service Costs (72921). P. M. La Bach. 700 w. R A G—Sept. 1, 1916. Table showing cost of water on 21 railroads, with remarks.

Water Waste

See Waste under CIVIL ENGINEERING, Water Supply.

Wheels

Friction with Reference to the Chilled Iron Wheel (68646 A). Ills. 2500 w. R M M—March, 1916. Brake efficiency.

The Chilled Iron Car Wheel (69409 A). Ills. 1200 w. R M M—April, 1916. Origin of flat spots and seams in treads;

Report of Standing Committee on Car Wheels (71872 N). 11 pp. Ills. M C B A—May 1, 1916. Changes recommended.

The Effect of Different Mixtures on the Strength of Chilled Car Wheels (72889 N). G. S. Evans. Ills. 44 pp. A F A—Sept., 1916. Tests of mixtures made at the Lenoir Car Works.

PERMANENT WAY AND BUILDINGS**Ballast**

Report of Committee II—On Ballast (68765 N). Ills. 46 pp. A R E A, Bul—Jan., 1916. Depth; methods of applying, etc.

Ballasting

Ballasting Track by Contract (70055). Ills. 3000 w. E N—May 4, 1916. Method on Missouri Pacific Ry.

Ballast Plough

Stone Ballast Plough, North-Eastern Railway (71206 B). L. W. Brown. Ills. 700 w. P-W I, JI—April, 1916.

Buildings

Report of Committee VI—On Buildings (68767 N). Ills. 1000 w. A R E A, Bul—Jan., 1916. Freight-house scales; ash-pits, etc.

Car-Repair Shed

An Interesting Car Repair Shed at Memphis, Tenn. (73544). Ills. 800 w. R A G—Sent 29, 1916. Details Illinois Central structure.

China

The Case for Machinery on Railway Construction in China (73012 A). Harold Stringer. 4000 w. Eng—Aug. 18, 1916. Estimates of machine performances in Chinese hands.

Men Cheaper Than Machines on Trunk-Line Railway Construction in China (74166). E. Park. Ills. 2000 w. E R—Oct. 28, 1916. Bridge caissons sunk without derricks. Ability of Chinese engineers and contractors.

Clearance

Report of Committee VII—On Rules and Organization (69052 N). 23 pp. A R E A, Bul—Feb., 1916. Rules for field parties, etc.

Coaling Stations

A New Type of Concrete Coaling Station (72678). Ills. 1000 w. R A G—Aug. 25, 1916. Structures of cylindrical section for the 'Frisco.

Consult Classification of the Index. See page 7.

Coal Stage

PERMANENT WAY AND BUILDINGS

Efficiency

Coal Stage

Mechanical Coal Stage, Dairycoates, Hull (73236 A). Ills. 1000 w. R G—Sept. 1, 1916. New mode of handling coal for locomotive engines.

Mechanical Coal Stage at Dairycoates (73731 A). Ills. 1200 w. C G—Sept. 22, 1916. Detailed description.

Coal Storage

Storage of Coal (67790 N). Ills. 50 pp. Int Ry Fuel Assn, Pro—1915. Committee report; with discussion. Kinds of coals, means of storage available and recommended.

La manutention mécanique des combustibles dans les dépôts de la Compagnie d'Orléans (70144 B). L. de Boysson. Ills. 3500 w. Gn Cv—Apr. 22, 1916. Methods of coal storage of the Orleans railroad.

Concrete

American Concrete Institute Convention (68948). 4000 w. R A G—March 17, 1916. Papers of interest to railway structural engineers.

Concrete Track Footings

Het proefspoor op voeten van gewapand beton in de lijn Amsterdam-Utrecht van de Staatsspoorwegen (66233 B). K. den Tex. Ills. 1000 w. Ing—Nov. 27, 1915. Experimental track in Holland laid with reinforced concrete footings under ties.

Concrete Work

Concrete Work on the Arizona Division of the Santa Fé (70521 A). Ills. 2000 w. R G—May 5, 1916. Uses of concrete.

Construction

Methods and Equipment Used in Railway Construction (67038). William C. Sloan. 2200 w. Cnr—Jan. 15, 1916. Part of paper before Inter. Engr. Cong.

Suction Dredges in Railroad Construction (67545). E. R. Stivers. Ills. 900 w. W E—Jan., 1916. Details of work on the C. B. & Q. railroad.

Construction Methods and Equipment of Railways (66781). William Griffith Sloan. 3500 w. Cn E—Dec. 23, 1915. From a paper before Int. Engng. Cong. Classes of work; new methods.

How Australia Builds Its Railroads (66151). Extracts from Maurice E. Kernot's paper before the Engng. Cong. 3000 w. E R—Dec. 4, 1915. Why direct labor has supplanted the contractor.

Contract Forms

Report of Special Committee on Uniform General Contract Forms (68511 N). 8 pp. A R E A, Bul—Dec., 1915. Critical review; siding agreements; interlocking aid railway crossings.

Convention

Bridge and Building Association Convention (74151). 12000 w. R A G—Oct. 27, 1916. Résumé of New Orleans meeting with abstracts of reports.

Crossings

Protection of Grade Crossings (68070 D). Ills. 3000 w. Am Ry Bldg & Bldg Assn—Oct. 1915. Committee report; with discussion.

Report of Committee IX—On Signs, Fences and Crossings (68109 N). Ills. 4500 w. A R E A, Bul—Nov., 1915. Recommended changes, concrete fence posts, etc.

Renewal of Crossings at the East End of Central Station, Newcastle-Upon-Tyne (69800 N). Basil Prockter Fletcher. Ills. 2500 w. I C E, No. 4073—1915. Details.

Curves

Economics of Curve Location with Particular Reference to Operating Advantages (68196). W. F. Rensch. 1500 w. R A G—Feb. 18, 1916. Errors; elements of question.

The Advantage and Cost of Transition Curves (69125 A). W. F. Rensch. 1600 w. R G—March 10, 1916. Methods employed.

A Practical Method for the Adjustment of Curves (73460 A). W. F. Rensch. 5600 w. R G—Sept. 15, 1916. Simple mathematical method applicable to the sharpest or the lightest curve.

Cutoff

Four Engineering Innovations on the Magnolia Cutoff (71506). Francis Lee Stuart. Ills. 2200 w. E N—June 29, 1916. Contracting details on B. & O. R. R.

Detroit Tunnel

Maintenance on the Detroit Tunnel Electric Zone (68993). Ills. 4000 w. El R JI—March 18, 1916. Methods.

Drainage

Formation and Prevention of Pockets and Soft Places (67218 A). C. A. Davis. 2500 w. R E & M W—Jan., 1916. Importance in construction and maintenance.

Various Methods of Draining Railway Roadbeds—(68151). M. C. Blanchard. Ills. 1500 w. E & C—Feb. 16, 1916.

Recent Developments in Roadbed Drainage (69786). W. F. Rensch. Ills. 1500 w. R A G—April 21, 1916. Methods and economies.

Drawbridges

Discussion of Report on Drawbridges (68773 N). Thomas S. Stevens. 600 w. A R E A, Bul—Jan., 1916. Comments by C. E. Smith.

Efficiency

Efficiency in the Bridge and Building Department (66592). George W. Rear.

Consult Classification of the Index. See page 7.

Electricity

3000 w. R A G—Dec. 17, 1915. Discusses important principles.

Efficiency in the Railway Bridge and Building Department (67223). George W. Rear. Read before Am. Ry. Bridge & Bldg. Assn. 3500 w. E & C—Jan. 12, 1916. Suggestions.

Electricity

Report of Committee XVIII—On Electricity (68768 N). 1000 w. A R E A, Bul—Jan., 1916. Clearances, etc.

Electric Lighting

Bruston Electric System of Lighting (66179 A). Ills. 700 w. R & L E—Dec., 1915. For smaller stations and round-houses.

Embankments

Raising the Grade on a High Embankment (69785). Ills. 2000 w. R A G—April 21, 1916. Handling traffic and overcoming slides at Sibley, Mo.

185-Foot Fill of Bessemer & Lake Erie Railroad Reaches Beginning of Last Stage (71558). Ills. 1700 w. E R—July 1, 1916. Fill near Culmerville, Pa.

Encroachments

Protecting the Right of Way From Encroachments (66584). W. F. Rensch. 2500 w. R A G—Dec. 17, 1915. Legal protection; means of retaining title.

Engine Houses

Modern Engine House Facilities and Methods (68277 A). J. H. DeSalis. 1500 w. C R C, Pro—Jan. 14, 1916. Layout and equipment.

Fence Posts

Service Tests of Treated and Untreated Fence Posts (72941 N). Harlow Bradley. Ills. and Tables. 2500 w. A R E A, Bul—July, 1916. Experiments and results.

Freight Stations

New Pittsburgh North Side Freight Station of the Pennsylvania Railroad (67662 A). Hartley M. Phelps. Ills. 1300 w. R G—Jan. 14, 1916. Details.

Fuel Stations

Fuel Stations (67786 N). Ills. 20 pp. Int Ry Fuel Assn, Pro—1915. Types and methods. Committee report; with discussion.

Grade Crossings

Grade Crossing Elimination at Cleveland (71102). Ills. 1500 w. R A G—June 16, 1916. The N. Y., C. & St. L. method of track depression for 2½ miles.

Single Grade-Crossing Elimination at Pittsburgh Will Cost \$750,000 (71140). Ills. 2200 w. E R—June 17, 1916. Unusually difficult problem.

Grade Crossing Elimination in Camden, N. J. (71788). Ills. 2000 w. R A G—July 14, 1916. Penn. R. R. elevating Atlantic City line tracks.

PERMANENT WAY AND BUILDINGS**Grade Crossings**

Raising the Railroad Through Wilkinsburg, Pennsylvania (71636 A). Ills. 3000 w. R G—June 16, 1916. Work carried out under heavy traffic.

Drainage Drifts Have Apparently Stopped Slides at Hillside Grade Separation (72129). H. G. Wray. Ills. 3300 w. E R—July 29, 1916. Problems at Cincinnati in grade elimination.

Grand Trunk Grade Separation in Toronto (72284 A). Ills. 3500 w. R G—July 1, 1916. Work of eliminating level crossings.

Difficult Grade Crossing Elimination in Albany, N. Y. (65859). Ills. 2200 w. Ry Age Gaz—Nov. 19, 1915. Measures adopted.

Track Elevation on the Nickel Plate Railroad at Chicago (65542). Ills. 1600 w. Eng News—Nov. 4, 1915. Complicated grade-crossing work.

Elimination of the Tower Grove Crossings, St. Louis, Mo. (65761 A). S. L. Wonsen. Ills. 3500 w. Assn Engng Socs, Jour—Oct., 1915. Conditions, plans, cost, conduct of work, etc.

The Adjustment of the Consequential Damages at the Tower Grove Crossings (65762 A). L. R. Bowen. 1500 w. Assn Engng Socs, Jour—Oct., 1915. Method of estimating damages and awards.

A Study of Grade Crossing Elimination in Cities (66652 B). C. N. Bainbridge. Also discussion. Ills. 43 pp. W S E—Oct., 1915. General features.

Belt Line Is Proposed as Solution of Dallas Grade-Crossing Problem (66384). Ills. 3500 w. E R—Dec. 11, 1915. John F. Wallace's plan for removing grade-crossings.

The Elimination of Grade Crossings in Dallas, Tex. (66363). Map. 2000 w. R A G—Dec. 10, 1915. Belt line better solution than track elevation.

A Large Track Depression Project at Minneapolis (66157). C. N. Bainbridge. Ills. 3500 w. R A G—Dec. 31, 1915. Concrete steel viaducts to eliminate 37 grade crossings.

Methods and Value of Grade Separation at Crossings (67220 A). Ills. 1500 w. R E & M W—Jan., 1916. Cost of elimination and of protection.

Track Elevation on Chicago & Western Indiana (68669). Ills. 2000 w. R A G—March 10, 1916. In Chicago.

Highway Crossing Elimination on the D. & H. and the C. & A. (69005 A). Ills. 1000 w. R E & M W—March, 1916. Structures for raising and depressing tracks.

Track Elevation and Station at Fort Wayne, Ind. (68937). Ills. 2400 w. E N

Consult Classification of the Index. See page 7.

Impact

PERMANENT WAY AND BUILDINGS

Rails

—March 16, 1916. Work of the Pennsylvania lines.

Eliminating a Group of Nine Grade Crossings on the Long Island R. R. (69717). William L. Selmer. Ills. 3500 w. R R—April 15, 1916.

An Interesting Track Elevation Project (69216). Ills. 3500 w. R A G—March 31, 1916. Evanston Branch of C., M. & St. P.

Extensive Grade Separation at Spokane, Wash (69926). Ills. 2000 w. R A G—April 28, 1916. Northern Pacific.

Impact

Discussion of Report on Sub-Committee on Impact and Stresses (68772 N). Henry B. Seaman, Diagram. 900 w. A R E A, Bul—Jan., 1916.

Junctions

Further Notes on the Solving of Double Line Junctions, etc. (73929 N). A. L. Westwick. 3000 w. P, W I, JI—Aug., 1916. Mathematical. Explains diagrams and formulæ.

Landscape Gardening

Scientific Landscape Gardening on Railroads (69781). Ills. 2500 w. R A G—April 20, 1916. Organization; principles.

Location

The Locating of a New Line (66783). David Wilson. From paper before Int. Engng. Cong. 2800 w. Cn E—Dec. 23, 1915. Problems in S. Africa.

Locomotive Works

The Montreal Locomotive Works (74082 A). Ills. 1500 w. R G—Oct. 6, 1916. Plant comprising 25 buildings.

Masonry

Report of Committee VIII—On Masonry (68507 N). 19 pp. A R E A Bul—Dec., 1915. Revision of manual; piles; concrete finish; piers, abutments, etc.

Materials

Some Foreign Specifications for Railway Materials: Rails, Wheels, Axles, Tires (70410 A). G. K. Burgess and P. D. Merica. 130 pp. U S B S, Tech paper 61—April 20, 1916. Discussion and comparison, with related information.

Mexico

A Review of the Report of Captain Andrew Talcott, Chief Engineer Mexico and Pacific Railroad, Eastern Division, from Vera Cruz to Mexico, Explorations, Surveys, Estimates, 1858 (72766 D). Map. 8pp. A S C E, Pro—Aug., 1916. Continued discussion of Emile Low's paper.

Rack Railroad

Handling of Filipino Labor One of Problems in Construction of Baguio Railroad (73254). Ills. 1500 w. E R—Sept.

16, 1916. The world's longest rack railroad.

Rail Breaking

Machines for Breaking and Punching Rails (73841 A). Ills. 700 w. Eng—Sept. 29, 1916. Built in America.

Rail Failures

Some Causes of Rail-Failure (73149 N). William Channing Cushing. 3500 w. I C E, Paper No. 4158—1916. (Abstract.) Study of many samples of failures, with conclusions.

Rail Joints

Application and Maintenance of Insulated Rail Joints (73094). E. F. Schermerhorn. 2000 w. R S E—Sept., 1916. General rules for installation and care to insure satisfactory service.

Test of Rail Joints (73875 N). H. B. MacFarland. Ills. 75 pp. A R E A, Bul—Aug., 1916. Comparative tests made to study the effects of certain conditions on the strength and rigidity of rail joints.

Rails

Influence on Rails of Method of Blooming (65888 N). M. H. Wickhorst. Ills. 23 pp. Am Ry Engng Assn, Bul—Sept., 1915. Tests, particularly transverse ductility of base of rail.

Rail Failure Statistics for 1915 (65886 N). M. H. Wickhorst. 23 pp. Am Ry Engng Assn, Bul—Sept., 1915. Statistics furnished by railroads of the United States.

Transverse Fissures the Result of Rail Gapping (65952). P. H. Dudley. Ills. 2500 w. Ry Age Gaz—Nov. 26, 1915. Types caused by local application of gag to base and head of rail respectively.

Etude comparative des spécifications en vigueur pour la fourniture des rails (68817 C + D). Goupil. Ills. 34 pp. P C An—Jul.-Aug., 1916. Discussion of French and foreign rail specifications and tests.

The Nick and Break Test in the Inspection of Steel Rails (69101 N). Robert W. Hunt and C. W. Gennet, Jr. Ills. 6 plates. 26 pp. A R E A, Bul—March, 1916. Results of investigations.

Report of Committee IV—On Rail (69054 N). 12 pp. A R E A, Bul—Feb., 1916. Failures; defective equipment; track bolts, nutlocks, etc.

Some of the Causes of Rail Failures (69100 N). W. C. Cushing. Ills. 6 plates, 19 sheets. 146 pp. A R E A, Bul—March, 1916. Study of many cases.

Transverse Fissures (68524). 2000 w. R A G—March 3, 1916. From report presented at convention of Nat. Assn. of Ry. Com., in San Francisco.

Internal Fissures in Rails (69056 N). Ills. 16 pp. A R E A, Bul—Feb., 1916.

Rail Stresses

PERMANENT WAY AND BUILDINGS

Snow Sheds

Types of fissures; chemical and physical properties.

Investigation of Initial Strains in Steel Rails (69389). Ills. 7000 w. R R—April 8, 1916. Rail which caused wreck on B. & O.; also others.

Rail Weights Reduced to Lengths, and Vice Versa (70483). James G. Wishart. 1800 w. E R—May 20, 1916. Tables for converting feet into tonnages, and tonnages into track miles.

Comparison des specifications en vigueur pour la fourniture des rails (72102). A. Goupil. Ills. 4500 w. Gn Cv—July 1, 1916. Strength comparison in rail specifications.

Rapport der Spoorstaafcommissie (72115). 1600 w. Ing—July 1, 1916. Report of the Rail Committee.

Flexion Des Rails De Tramway (72820 B). P. Caufourier. 1100 w. Gn Cv—Aug. 12, 1916. Deflection of tramway rails. Mathematical treatment.

Initial Strains in Rails (72677). 2800 w. R A G—Aug. 25, 1916. Investigation of derailment caused by a broken rail. Caused primarily by a split head.

Rail Design, Wear and Corrugation (72754 A). Robert B. Holt. Ills. 2000 w. T & R W—Aug. 10, 1916. Reviews recent investigations and gives report of tests on air-cooled Sandberg steel.

Rail Failure Statistics for 1915 (73873 N). M. H. Wickhorst. 30 pp. A R E A Bul—Aug., 1916. Tabulated statistics, with notes.

Segregated Streaks in Steel Rails (73874 N). George F. Comstock. Ills. 24 pp. A R E A, Bul—Aug., 1916. Explains value of streaks, their causes and results.

Transverse Fissure Rail 51051 (73872 N). M. H. Wickhorst. Ills. 1000 w. A R E A—Aug., 1916. Results of tests of a rail that failed.

Rail Stresses

Lateral Stresses on Rails in Curves (70746 A). George L. Fowler. Ills. 3000 w. R G—May 12, 1916. Experimental investigations and results.

Re-alignment

A Junction Realignment Job (73927 N). E. Treacher. Ills. 2000 w. P, W, Il—Aug., 1916. Details of a problem in curve alignment and junction design.

Reinforced Concrete

Unit System of Reinforced Concrete for Railway Structures (67204). Shirley Houghton. Ills. 1500 w. W E—Jan., 1916. Serial, 1st part. Erection of pre-cast units.

Roadway

Report of Committee I—On Roadway (68764 N). 4000 w. A R E A Bul—Jan.,

1916. Changes in manual; unit pressures; water pockets, etc.

Rock Cuts

Covering a Rock Cut with Gunite (69783). N. W. McCallum. Ills. 800 w. R A G—April 21, 1916. Details.

Roundhouse

New Lehigh Valley Roundhouse at Sayre, Pa. (69520). Ills. 1000 w. R A G—April 14, 1916. Concrete structure.

Scales

The Largest Railroad Track Scale in the World (68193). Ills. 1200 w. R A G—Feb. 18, 1916. The installation at West Albany, N. Y. Capacity 825 tons.

Designing a Scale to Order (69833). Eugene Motchman. Ills. 1400 w. R R—April 22, 1916. Serial, 1st part.

Calculations of Scale Members (73434). Eugene Motchman. Diagrams. 1200 w. R R—Sept. 23, 1916. Serial, 1st part. Shows two methods; one based on arithmetical calculations; the other a graphical method.

See also *Track Scales*.

Scrap

Reclamation on the Rock Island (73729). J. G. Kirk. Ills. 1200 w. R A G—Oct. 6, 1916. Abstract of a first prize article on "Reclamation of Scrap Maintenance-of-Way Materials."

Shops

The National Transcontinental Railway Shops (67969 A). Ills. 3500 w. R M M—Feb., 1916. Construction and equipment, at Winnipeg.

Side-Hill Construction

Einige Erfahrungen im Lehnnebau an der Südrampe der Lötschbergbahn (70192 B). C. Andrea. Ills. 1500 w. S B—May 6, 1916. Serial, 1st part. Experiences in difficult side-hill construction on the Lötschberg road.

Sidings

Location of Passing Sidings on Single Track (66763). F. L. Dodgson. 1800 w. R A G—Dec. 24, 1915. To obtain maximum capacity of road.

Cost of Maintaining Private Sidings (67852). 1600 w. R A G—Feb. 4, 1916. Economics of contract with shippers.

Smoke

Experience with Engine-House Smoke Washer (65545). M. D. Franey. Ills. 1200 w. Eng News—Nov. 4, 1915. Read at Cincinnati. At Englewood terminal, Chicago.

Snow Sheds

Snowsheds and Tunnels on the Great Northern Ry. (71265). Ills. 1500 w. E N—June 22, 1916. Protection against snowslides.

Consult Classification of the Index. See page 7.

Standardization

PERMANENT WAY AND BUILDINGS

Terminals

Standardization

A System for Standardizing Maintenance of Way Work (67394 N). Earl Stimson. 5000 w. A R E A Bul—Oct., 1915. Benefits to be derived. System of B. & O. Railroad.

Stations

The Union Station Ordinance, Cleveland (66014 A). R. O. Rote. 4500 w. Cleveland Engng Soc, Jour—Nov., 1915. Provision of ordinance in regard to lands for extension and improvements.

New Los Angeles Station Provides Unusual Conveniences for Passengers (66788). Ills. 1400 w. E R—Dec. 25, 1915. Ramps instead of stairways; ticket-office innovations, etc.

The Use of Brick for Station Platforms (66863). Edwin G. Zorn. Ills. 1200 w. R R—Jan. 1, 1916. Advantages and cost. "Gilded Stairs and Marble Halls" (67094 A). Reginald Gordon. Ills. 4500 w. E M—Feb., 1916. Plea for more practical construction in railroad stations.

Plan for Lehigh Valley Station at Buffalo Places Train Shed Columns Between Tracks (68218). Ills. 2200 w. E R—Feb. 19, 1916. Design for 9-track shed.

"Soo Terminal" Type of Station, Being Built by Lackawanna at South Orange. Nears Completion (68981). Ills. 3500 w. E R—March 18, 1916. In connection with track elevation.

Lackawanna Improvements at South Orange (69098). A. B. Cohen. Ills. 3000 w. R A G—March 24, 1916. New station and extensive track elevation.

Reconstruction of Denver Union Station (69357). Ills. 2500 w. R A G—April 7, 1916. Extensive improvements.

Large Passenger Station at New Orleans (70779). Ills. 1800 w. R A G—June 2, 1916. Central location for new terminal buildings.

Structures

Cost of Structures (68066 D). 4000 w. Am Ry Bldg & Bldg Assn—Oct., 1915. Report of committee; with discussion.

Report of Committee XV—On Iron and Steel Structures (68111 N). 5000 w. A R E A, Bul—Nov., 1916. Protection from corrosion, marble bridges, column tests, etc.

Subways

Kenilworth Avenue Subway, Hamilton (72698). Kenneth Cameron. Ills. 2000 w. Cn E—Aug. 24, 1916. Details of typical grade separation work.

Swamps

Where Possible Would Avoid Muskeg Swamps (68574). J. L. Pickles. 1500 w.

E R—March 4, 1916. Expedients for crossing when necessary.

Syria

The Railway Lines of Syria and Palestine (72691 A). Lewis R. Freeman. Map & Ills. 2500 w. R G—Aug. 11, 1916. Details of the lines and equipment.

Tanks

Railway Water Tanks (68065 D). Ills. 9000 w. Am Ry Bldg & Bldg Assn—Oct., 1915. Report of committee, appendix and discussion.

Terminals

The Cleveland & Youngstown Freight Terminal Ordinance (66016 A). W. E. Pease. Ills. 4800 w. Cleveland Engng Soc, Jour—Nov., 1915. Outlines the project and its aim. Discussion.

New Engine Terminal for the O. W. R. R. & N. Co., Spokane, Wash. (65574). Ills. 1000 w. Ry Rev—Nov. 6, 1915. Details.

A Modern Terminal Layout for Passenger Equipment (68377). Ills. 3000 w. R A G—Feb. 25, 1916. B. & O. in Chicago.

Suggested Improvements in the Terminal Situation of St. Louis (68091 A). F. G. Jonah. Also discussion. Maps, Ills., and plans. 55 pp. E C S L, JI—Jan.-Feb., 1916. Problems and suggestions.

The Necessity for Improved Systems at Railway Terminals (69244). A. Jackson Marshall. 2500 w. R R—April 1, 1916. Congested freight.

Synopsis of the Report of the Chicago Association of Commerce Committee on Smoke Abatement and Electrification of Railway Terminals (69758 A). George Gibbs. With discussion. 80 pp. N Y R C, Pro—March 17, 1916. Enormous cost of electrification.

Operating a Large Engine Terminal (69402 A). F. W. Schultz. 1000 w. R M E—April, 1916. Suggestions.

The Design of Large Passenger Terminals (70060). T. L. Busfield. 5500 w. R A G—May 5, 1916. Essential features to be considered.

The Design of Passenger Terminals (72364 N). J. L. Busfield. Ills. 42 pp. C S C E—March 2, 1916. General principles.

A New Terminus for the Southern Railway at Birmingham, Ala., U. S. A. (73004 A). Ills. 1800 w. R G—Aug. 25, 1916. Details of yard arrangements, etc.

New Lehigh Valley Terminal at Buffalo (73206). Ills. 2500 w. R A G—Sept. 15, 1916. Interesting features of a new passenger station.

Consult Classification of the Index. See page 7.

Ties **PERMANENT WAY AND BUILDINGS** **Track Materials**

Ties

Durability Records of Cross Ties (67471 N). C. P. Winslow and C. H. Teesdale. 2500 w. A W P A—Jan., 1916. Tabulated data, with introductory notes.

Report of Committee on Service Tests of Cross Ties (67470 N). Ills. 2500 w. A W P A—Jan., 1916.

Woods Suitable for Cross Ties (67469 N). R. Van Metre. 1000 w. A W P A—Jan., 1916. Requirements, mechanical and other.

Report of Committee III—On Ties (68508 N). Ills. 37 pp. A R E A, Bul—Dec., 1915. Tie plates; spikes; life of ties; specifications; metal, composite and concrete ties.

Renewal of Sleepers—Inspection, Marking and Records (68450 A). 2500 w. R G—Feb. 11, 1916. Practice on 16 typical roads.

Discussion of Woods Suitable for Cross Ties (71254 N). Carlile P. Winslow and John A. Newlin. 1500 w. A W P A—Jan., 1916.

Durability Records of Cross Ties (71255 N). C. P. Winslow and C. H. Teesdale, with discussion. 48 pp. A W P A—Jan., 1916. Tabulated reports of service tests.

Tie-Treating Plant

New Tie-Treating Plant on the Northwestern Railway (69777). L. J. Putnam. Ills. 4000 w. E N—April 20, 1916. At Riverton, Wyo.; zinc-chloride.

Track

Construction of the Roadbed and of the Track (66466). E. A. Hadley. Also discussion. 5000 w. S L R C—Nov. 12, 1915. Materials and methods used.

Construction of Roadbed and Track (68023 A). 1200 w. R E & M W—Feb., 1916. Relation of ties, ballast and sub-grade.

Report of Committee V—On Track (68766 D). Ills. 24 pp. A R E A, Bul—Jan., 1916. Economics of labor, tests, layouts, etc.

An Inefficient Element in Modern Track Design (68947). John B. Seymour. 1500 w. R A G—March 17, 1916. New form of joint.

The Difficult Maintenance of Beach Track (69006 A). Joe Rodman. Ills. 1500 w. R E & M W—March, 1916. Conditions and successful methods.

The Track Foundation (72586). 2200 w. R R—Aug. 19, 1916. Reasons for track setting; improvements in building embankments.

How Location Affects Track Maintenance (72953). Kenneth L. Van

Auken. 2500 w. E R—Sept. 2, 1916. Difficulties due to poor sites.

Track Accessories

Manganese Steel Crossings (67007 C). C. Haines. Ills. 7 pp. P-W I JI—Dec., 1915. Use by Metropolitan Railway. Results.

Test of Track Bolts and Wrenches (67395 N). Earl Stimson. Ills. 2000 w. A R E A Bul—Oct., 1915. Relation between loads on the bolts when drawn up tight with various length wrenches and elastic limit of bolts. Advantages of standardization.

Track Elevation

St. Paul Is Doing Intricate Track-Elevation Work in Chicago with Company Forces (71822). Ills. 2500 w. E R—July 15, 1916. Tracks being lifted on narrow right-of-way without disrupting 4 min. schedule. Ingenious methods of handling the work.

Ideas to Be Obtained From a Big Track Elevation Job (73282 A). Stanley E. Bates. Ills. 2000 w. Cnr—Sept. 15, 1916. Manner of handling work in Chicago.

Track Inspection

The Forty-fourth Annual Track Inspection of the Pennsylvania (73867). Ills. 1500 w. R A G—Oct. 13, 1916. Account of the trip made on Oct. 3 and 4.

Track Maintenance

Proper Organization of Section Forces and Methods for Maintaining and Policing Track (67009 N). 54 pp. Main Way Bul—Nov. 10, 1915. Three reports of sub-committees covering heavy and light track and terminals, with extensive discussion.

The Permanent Track Organization on the Long Island (67497). G. P. Williams. 1700 w. R A G—Jan. 21, 1916. Efficiency greatly increased.

The Duties of a Platelayer (67008 C). G. Hughes. 22 pp. P-W I JI—Dec., 1915. Practical hints in track repair.

Principles Governing the Allotment of New Rail (68194). 2500 w. R A G—Feb. 18, 1916.

Conserving the Supply of Track Laborers (68226). J. P. Costello. 2000 w. R R—Feb. 19, 1916. Suggestions for increasing efficiency.

Efficiency and Standardization in Track Maintenance Work (68022 A). 2500 w. R E & M W—Feb., 1916. Determining efficiency of gangs.

Track Materials

Tables for the Distribution of Track Materials (66588). Kenneth L. Van Auken. 1000 w. R A G—Dec. 17, 1915. Information for unloading ties, bolts,

Track Resistance

spikes, and other supplies from moving train.

Track Resistance

Die Widerstandsformeln für Eisenbahnzüge in ihrer Entwicklung (70109 B). H. Nordmann. Ills. 5000 w. G A G B—April 15, 1916. Serial, 1st part. Development of formulas for track resistance.

Track Scales

Adjusting Railroad Track Scales (65858). Diagrams. 1200 w. Ry Age Gaz—Nov. 19, 1915. Advantages of the off-section loading.

A Plate Fulcrum Track Scale (66590). Ills. 1000 w. R A G—Dec. 17, 1915. Installed at East Tyrone, Pa., by Penn. R. R.

Testing and Adjusting Track Scales by the Graphical Method (71829). C. A. Briggs. Ills. 3000 w. R R—July 15, 1916. Explains method and results.

Testing Railway Track Scales by Test Cars (73695 A). Herbert T. Wade. Ills. 2000 w. R & L E—Oct., 1916. Types of test weight cars.

Track Tools

The Proper Repair of Tools for Track Maintenance (65856). M. E. Carroll. Ills. 2000 w. Ry Age Gaz—Nov. 19, 1915. Work should be done under adequate administration.

Train Sheds

Reinforced Concrete Train Shed of Unit Construction (67068). Ills. 3000 w. R A G—Jan. 28, 1916. Construction details at Los Angeles, Calif.

Design and Construction of the Unit-Built Reinforced Concrete Train Sheds of the Denver Union Station (74133). Albert M. Wolf. Ills. 1800 w. E & C—Oct. 25, 1916. Details and methods.

Tunnels

Completing the Mount Royal Tunnel into Montreal (73235). Ills. 2500 w. R G—Sept. 1, 1916. Project of the Canadian Northern nearing completion.

Tunnel Ventilation

Notes on the Improvement in the Ventilation of Woodhead Tunnels, Great Central Railway (73148 N). James Benjamin Ball. Ills. 2000 w. I C E, Paper

ROADS AND PROJECTS**Bagdad Ry.**

No. 4186—1916. Explains conditions and methods applied.

Turntable

Pounding Prevented in 100-Foot Santa Fé Turntable (73444). Ills. 600 w. E R—Sept. 23, 1916. Special cast-steel track blocks and rail locks used.

Water

Report of Committee XIII—On Water Service (68110 N). 3000 w. A R E A, Bul—Nov., 1915. Recommendations; pumping costs; protection against freezing.

Water Waste (68072 D). C. R. Knowles. Ills. 4000 w. Am Ry Brd & Bldg Assn—Oct., 1915. Forms, cost, remedies; with discussion.

Water Tanks

Railway Roadside Water Tank for Locomotive Supply (65857). Abstract of report to Am. Ry. Bridge & Building Assn. 4000 w. Ry Age Gaz—Nov. 19, 1915. Details of construction and maintenance with comparative costs.

Widening

Widening at Nine Elms Between Wandsworth Road and Loco Junction, L. & S. W. R. (69315 A). Ills. 1000 w. R G—March 17, 1916. Improvements.

Yards

Freight Yard at Birmingham, Ala. (66356). Ills. 2000 w. E N—Dec. 9, 1915. New gravity switching yard.

Yard Operation (68276 A). J. R. Hamilton. Also discussion. 6000 w. C R C, Pro—Jan. 14, 1916. Working 15 or more switch engines.

Report of Committee XIV—On Yards and Terminals (68510 N). 19 pp. A R E A, Bul—Dec., 1915. Revision of manual; freight; passenger stations; classification yards; track scales.

The Interchange Problem in Yard Operation (69316 A). E. C. Tucker, 1000 w. R G—March 17, 1916. Aids to economy.

The New Yard at Khargpur, Bengal-Nagpur Railway (72283 A). Ills. 1000 w. R G—July 21, 1916. Signalling description.

ROADS AND PROJECTS**Africa**

De ontwikkeling van het spoorwegnet in Centraal-Afrika (65976 B). L. Kooyker. Ills. 3500 w. Ingenieur—Oct. 30, 1915. Survey of progress in railroad building in Central Africa.

Railway Development in Africa (66635 A). 3000 w. Eng—Dec. 3, 1915. Editorial on problems.

Asia Minor

La situation des chemins de fer en Asie Mineure et les projets germanoturcs (67003 B). V. Roux. Ills. 1500 w. G C—Dec. 18, 1915. Asia Minor's railroads and projects.

Bagdad Ry.

The Bagdad Railway and the European War (68670). Lewis R. Freeman. Ills.

Consult Classification of the Index. See page 7.

Baltimore & Ohio

3000 w. R A G—March 10, 1916. Progress up to outbreak of war.
The Baghdad Railway (68271 A). Map. 2500 w. Enr—Feb. 4, 1916. Progress of construction.

Baltimore & Ohio

The Magnolia Cut-Off on the Baltimore & Ohio Railroad (67217 A). Ills. 2200 w. R E & M W—Jan., 1916. Lower grades and reduced mileage.

Belgium

A History of the Railway Lines of Belgium (68942). E. J. Hubaux. Map. 2500 w. R A G—March 17, 1916. Controlled by Government, partly built by private capital.

Brazil

Railways of Brazil (66390 A). F. A. Molltor. Ills. 2000 w. R E & M W—Dec., 1915. Southern Brazil.

Brazilian Opportunities and the Brazil Railway (68368). F. E. Lawrence. Ills. 4500 w. E N—Feb. 24, 1916. General survey.

Burlington

A New Connecting Link of the Burlington (71270). Ills. 2000 w. R A G—June 23, 1916. Character and construction of the line.

Canada

Railroad Development in Canada (69535). J. L. Payne. 1800 w. Cn E—April 13, 1916. Mileage, the cost, traffic, earnings.

Canadian Railways in the Eventful Year 1915 (70061). J. L. Payne. 1800 w. R A G—May 5, 1916. Railway operations and outlook.

Canadian Northern

The Canadian Northern Extension to Vancouver (67853). V. J. Boland. Ills. 2000 w. R A G—Feb. 4, 1916. Heavy work.

Canadian Pacific

The Canadian Pacific Railway System (67331 A). 1400 w. R G—Dec. 31, 1915. Review of expenses and revenue during the year ending June 30, 1915.

Triumph of Grade Reductions and Other Important Improvements on the Canadian Pacific Railroad (68594 A). Ills. 1300 w. R & L E—March, 1916. Tunnel construction.

Ceylon

The Indo-Ceylon Connection (69581 A). 2000 w. R G—March 24, 1916. Causes of differences in the administration of Ceylon railways.

Chesapeake & Ohio

Building the Chesapeake & Ohio Northern Railway (66995). Ills. 3700 w. E N—Jan. 6, 1916. Heavy rockwork.

ROADS AND PROJECTS**Greenock****Chesapeake & Ohio N.**

Construction of the Chesapeake & Ohio Northern (68526). Ills. 3000 w. R A G—March 3, 1916. Link between W. Va. and Great Lakes.

China

Railways in China (68685 B). William Barclay Parsons. Ills. 8000 w. E C P, Pro—Jan., 1916. Reviews history.

Coal Roads

Carolina, Clinchfield & Ohio and Virginian (69095). 1400 w. R A G—March 24, 1916. Capitalization and operating statistics compared.

Colombia

Railways of the Republic of Colombia, South America (68019 A). Jose M. Rosales. Ills. 1200 w. R E & M W—Feb., 1916.

Cuba

Construcción de un Ferrocarril sobre cayos en la Bahía de Caibarién (71313 A). Jorge Brödermann. Maps. 45 pp. S C I Rv—May, 1916. Projected railway connecting Caibarien with important adjacent keys.

England

Les chemins de fer en Angleterre (65468 B). J. Carlier and H. Dedroog. Ills. 5000 w. Gen Civ—Oct. 30, 1915. Serial, 1st. part. History and general description of English railways.

Eskdale

The Eskdale Railway: a Narrow-Gauge Equipment (66688 A). Maps & Ills. Plates. 4500 w. Eng—Dec. 10, 1915. Serial, 1st part. Details of a 15-in. road and rolling stock.

France

The French State Railways (72011 A). 2200 w. Eng—July 7, 1916. Editorial on the working, and service during the war. Results accomplished.

Furka Line

The Furka Railway and Furka Tunnel (65783 A). 1200 w. Engng—Nov. 5, 1915. Details of new line in Switzerland.

The Furka Pass Railway (70085 A). 1500 w. Enr—April 21, 1916. Particulars of locomotives on transalpine line.

Great Western Ry.

Great Western Railway Departmental Organization (65775 A). Maps. 3500 w. Ry Gaz, Lond—Nov. 5, 1915. Reproduction from a pamphlet recently issued, with comments.

Greenock

Railway Engineering in Greenock District (73928 N). John W. Grant. Ills. 2800 w. P, W I, JI—Aug., 1916. Details of the work in district named.

Consult Classification of the Index. See page 7.

Holland**ROADS AND PROJECTS****N. Y. Connecting R. R.****Holland**

Mededeeling over den aanleg der spoorwegen van de Hollandsche Electriche Spoorweg-Maatschappij in de Haarlemmermeer en omgeving (65410 B). J. W. Th. Van Oyen. 2500 w. Ingenieur—Oct. 9, 1915. Outline of plan by the Holland Electric Railway for building in the vicinity of the Haarlem polder.

Hudson Bay

Construction of the Hudson Bay Ry. (68034). Map and Ills. 1800 w. R R—Feb. 12, 1916. Progress and history of this project.

India

Indian Railways (66081 A). 3500 w. Enr—Nov. 19, 1915. Serial, 1st part. Review of administration report for year ended March 31, 1915.

British India's Railroad Development (68367 A). Joseph King Goodrich. 1800 w. I A—Feb. 24, 1916. Changes.

The 2-Ft. Gauge Gwalior Light Railways, Central India (70442 A). Ills. 2000 w. R G—April 28, 1916. Details of line and equipment, with history.

Italy

Passaggio ferroviario dello Spluga (66259 N). Emilio Bertta. Ills. 9 pp. C I A At—Sept.-Oct., 1915. Arguments for Spluga Pass route through Alps.

Japan

Railway Development in Japan (69867 A). Ills. 1000 w. R G—April 7, 1916. Serial, 1st part. New central station at Tokyo in this number.

Lackawanna

Completing the Summit Cut-Off of the Lackawanna (65317). Ills. 1000 w. Ry Age Gaz—Oct. 29, 1915. Finishing work on the Nicholson viaduct.

Shortening the Lackawanna Railroad (69327 A). Ills. and plate. 1500 w. Enr—March 17, 1916.

Material Yards

Material Yards on Railroad Construction Work (74011). R. L. Morrison. 3500 w. E & C—Oct. 18, 1916. Proper location and layout.

Mersey Ry.

Notes on the Mersey Railway (66637 A). Joshua Shaw. Map. 2500 w. R G—Dec. 3, 1915. Serial, 1st part. Read before Liverpool Engng. Soc. History and detailed description.

Mexican Railway

The Mexican Railway; 1873 and 1915 (65946). Ills. 2300 w. Eng News—Nov. 25, 1915. Difficulties of the original location made by American engineers. Special locomotives for operating 4 per cent grades.

Mexico

A Review of the Report of Captain Andrew Talcott, Chief Engineer Mexico and Pacific Railroad, Eastern Division from Vera Cruz to Mexico Explorations, Surveys, Estimates, 1858 (66720 D). Emile Low. Maps. 20500 w. A S C E—Dec., 1915. Details of history from notes.

A Review of the Report of Captain Andrew Talcott, Chief Engineer Mexico and Pacific Railroad, Eastern Division from Vera Cruz to Mexico, Explorations, Surveys, Estimates, 1858 (69909 D). 2500 w. A S C E, Pro—April, 1916. Continued discussion of Low's paper.

Mount Washington

The Mount Washington Railway (69415 A). Hugh G. Boutell. Ills. 1200 w. R M M—April, 1916. Line, rolling stock, operation.

New England

Early Engineering Triumphs in New England (69299 A). Ills. 700 w. R & L E—April, 1916. Tunnels, curves and grades not yet surpassed.

The Operation of the Railroads in New England (70778). W. J. Cunningham. Ills. 5000 w. R A G—June 2, 1916. Statistical information from Commission Reports.

New Haven

Improvements at Pawtucket and Central Falls (67140). Ills. 2200 w. R A G—Jan. 7, 1916. New Haven completing four-track line and station and eliminating grade crossings.

New South Wales

The Equipment of Intermediate Sidings and Single-Line Crossing-Loops, New South Wales Government Railways (69813 N). Alexander Sinclair Macdonald Caldwell Smith. 17 pp. I C E, No. 4083—1915. Principal features of layout and equipment.

New York Central

Four-Tracking of the Hudson Division of the New York Central R. R. (66391). Ills. 2000 w. R R—Dec. 11, 1915. Relocation, grading, new structures.

West Side Improvement Plans of New York Central Railroad in New York Filed (70210). Ills. Also editorial. 4000 w. E R—May 6, 1916. Relocation, track elevation, yard reconstruction, covering of tracks, and electrification.

New York City

A Study in Electrified Freight Terminals (72084). Ills. 3500 w. R R—July 29, 1916. Proposed improvement of the N. Y. C.'s west side freight line in N. Y. city.

N. Y. Connecting R. R.

First All-Rail Through Route Across New York City (67263). Ills. 2700 w.

Norfolk & Western

E N—Jan. 13, 1916. Also editorial. Description and perspective view.

Norfolk & Western

A New Cut-Off on the Norfolk & Western (69522). Ills. 1500 w. R A G—April 14, 1916. Exceptional grades eliminate pusher service.

The Operation of the Norfolk & Western (69215). Ills. 5500 w. R A G—March 31, 1916. Successful methods followed.

Paducah & Illinois

Construction Work on the Paducah & Illinois Railroad (67851). Ills. 1500 w. R A G—Feb. 4, 1916. Details of work on 14-mile line.

Rock Island

An Operating Study of the Rock Island (70464). Ills. 8000 w. R A G—May 19, 1916. Physical conditions and efficiency.

Russia

Railway Construction to Russia's Northern Ports. 67641.) Map. 1500 w.

TRAFFIC**Freight Congestion**

R R—Jan. 29, 1916. New routes to relieve congestion at Archangel and give access to Kola.

Scotland

The Lothians Railways (70075 A). Ills. 2500 w. R G—April 21, 1916. Features of improvements.

Tunnel

Tunnel onder het IJ voor spoorwegverbinding (72116). W. Fenenga. Ills. 2000 w. Ing—July 1, 1916. Railway junction by tunnel under the River Y.

United States

New Railway Construction Statistics for 1915 (66845). Also editorial. 4500 w. R A G—Dec. 31, 1915. Less track built in U. S. than for any year since 1864.

Wales

The Swansea District Lines, G. W. R. (72525 A). Map & Ills. 2500 w. R G—July 28, 1916. New lines and the districts they are to serve.

TRAFFIC**Car Inspectors**

The Making of Good Car Inspectors (65586 A). 4000 w. Ry Age Gaz (Mech Ed)—Nov., 1915. Serial, 1st part. Papers on training and development. First prize paper, A. M. Orr.

Car Loading

Campaign to Increase Car Loading on the Chicago & North Western (69099). 2500 w. R A G—March 24, 1916. For more efficient use of equipment.

Car Pooling

The Wagon Pooling Project (67245 A). B. P. Wilson. 3000 w. I & C T R—Dec. 24, 1915. Organized system as remedy for congestion.

The Pooling of Railway Wagons (70024 A). 2500 w. Enr—April 4, 1916. Problem in Great Britain.

Chicago

The Railway Traffic of the Chicago Terminal (67265). 2500 w. R A G—Jan. 14, 1916. Statistics on magnitude and growth of freight and passenger business.

Claims

The Reduction of Over, Short and Damage Claims (71271). 6500 w. R A G—June 23, 1916. Four discussions of methods.

Clearing House

A Less-Than-Carload Clearing House (69518). Henry A. Goetz. Maps. 5000 w. R A G—April 14, 1916. Solution at Chicago.

Commerce

The Causes and Effects of Traffic in Goods (69196 A). David B. Rushmore and R. H. Rogers. 1500 w. G E R—April, 1916. Discussion.

Erie

Studies in Operation—The Erie Railroad (69924). Ills. 5000 w. R A G—April 28, 1916. Rehabilitation.

Europe

Europe Struggling with a Ship and Car Shortage (70019 A). Ills. 2500 w. R G—April 14, 1916. Cost of freight tie-up.

France

French Railway Traffic and the War (67240 A). 2200 w. Eng—Dec. 24, 1915. Review of traffic receipts and expenditures.

Freight

Reducing Cost of Handling L. C. L. Freights (68381). 4000 w. R A G—Feb. 25, 1916. Papers describing methods applied at different stations.

One System of Checking L. C. L. Freight (71950). W. F. Northrup. 1000 w. R A G—July 21, 1916. Details of system, and its advantages.

Freight Congestion

Traffic's Strangle-hold on Business (69341). E. L. Shaner. Ills. 6000 w. I T R—April 6, 1916.

The Tie-Up as Gotham Sees It (69342). C. J. Stark. Ills. 1500 w. I T R—April 6, 1916. Conditions at New York.

Consult Classification of the Index. See page 7.

Freight Handling**Freight Handling**

The Economical Handling of L. C. L. Freight Traffic (65953). 6000 w. Ry Age Gaz—Nov. 26, 1915. Two prize papers. I. How the Operation of One Local Freight Station Was Improved. C. B. Anderson. II. Important Principles in the Handling of L. C. L. Freight. C. G. Johnson.

Starting Right in Handling L. C. L. Freight Traffic (67139). 6000 w. R A G—Jan. 7, 1916. Papers received in contest. Importance of properly preparing parcels for shipment.

Scientific Management Applied at One Station (72442). William J. Collins. 2500 w. R A G—Aug. 11, 1916. Syracuse, N. Y.

How to Cut Freight Handling Cost (73599 A). A. Jackson Marshall. Ills. 1500 w. M Ry—Oct., 1916. Relative expense of automatic and hand trucks.

Fruit Cars

Nieuwe wagens voor het vervoer van bananen (72338 B). P. Labrijn. Ills. 1500 w. Ing—May 20, 1916. New cars for carrying bananas.

Immigration Service

Federal Immigration Service and the Railroads (67145). W. L. Stoddard. 1000 w. R A G—Jan. 7, 1916. Comments on suggestions in report of Commissioner General A. Caminetti.

Loading

Report of Standing Committee on Loading Rules (71879 N). Ills. 12 pp. M C B A—April 17, 1916. Changes recommended.

Mail Service

Railway Mail Pay on Space Basis (73730). H. F. Lane. 2500 w. R A G—Oct. 6, 1916. Explanations of the plan.

Mail Pay Controversy Renewed (74026). H. F. Lane. 1600 w. R A G—Oct. 20, 1916. Proposed changes.

M. C. B. Rules

Annual Report of Standing Committee on M. C. B. Rules of Interchange (69453 A). 45 pp. C R C, Pro—March 9, 1916. Recommendations.

Operating Costs

Is the Ton-Mile the Proper Basis for Allocating Operating Costs? (70377). Paul M. La Bach. 2500 w. E R—May 13, 1916. Maximum loads more pertinent than total tonnages.

Pooling

Difficulties of Wagon Pooling (69014 A). 2500 w. R G—March 3, 1916. Problems.

Rates

The Function of Federal Valuation in Rate Making (70365). C. C. James. 2000 w. R R—May 13, 1916. Read before R R

TRAFFIC**War Operation**

Men's Imp. Assn. of N. Y. Valuation will be protection against reduction.

Change of Railroad Rates in West Virginia (66373). J. W. Dawson. 4000 w. Also editorial. Cl A—Dec. 11, 1915. Abstract of paper read before the W. Va. Board of Trade, Fairmont, W. Va.

Canadian Railway Commission Approves Advances in Eastern Freight Rates (71790). 2000 w. R A G—July 14, 1916. Official summary of reasons for granting increase.

Refrigerator Cars

Northern Pacific Express Refrigerator Cars (70911). Ills. 800 w. R A G—June 9, 1916. For perishable goods.

Single Track

First Step is Made in Mathematical Analysis of Capacity of Single Track (69117). 1800 w. E R—March 25, 1916. Formulas.

Relation Between the Number of Trains and Passing Points (68798 A). Paul M. La Bach. 500 w. R G—Feb. 25, 1916. Diagram and explanatory notes.

Snow Handling

Voorzieningen ten voorkoming van verkeersbelemmeringen door sneeuw op den spoorweg Kristiania-Bergen (72114). F. L. Haider. Ills. 2000 w. Ing—June 24, 1916. Providing for the prevention of traffic obstruction by snow on the Kristiania-Bergen railway.

Tie Cars

Tie Cars for the Atchison, Topeka & Santa Fe Ry. (71146). Ills. 1200 w. R R—June 17, 1916. Cars for special service.

Tonnage Rating

Road Trials to Determine Tonnage Rating (66369). E. S. Barnum. 700 w. R A G—Dec. 10, 1915. Proper method.

Trade

The Relation of U. S. A. Railroads to Foreign Trade (73002 A). Fairfax Harrison. 3500 w. R G—Aug. 25, 1916. Conditions after the war, and how the railways may aid.

Train Loading

Scientific Train Loading; Tonnage Rating (65575). O. S. Beyer, Jr. Before Trav. Engrs.' Assn. 3500 w. Ry Rev—Nov. 6, 1915. Factors in train haul problems.

Train Resistance

Report of Committee on Train Resistance and Tonnage Rating (71889 N). 24 pp. A R M M A—April 21, 1916. Data on curve resistance, tractive effort, etc.

War Operation

The Railroad Soldier at the Front (65318). Walter S. Hiatt. 900 w. R A G—Oct. 29, 1915. Transportation prob-

Consult Classification of the Index. See page 7.

American Railways

lems, construction work, and other war tasks.

Les chemins de fer Francais et la Guerre (68814 B). Auguste Pawlowski. Ills. 4000 w. Gn Cv—Feb. 19 1916. Serial, 1st part. Organization and oper-

MISCELLANY

Railway Problems

ation of French railways in time of war. **Women Employees**

The Efficiency of French Women as Railway Workers (65855). Walter S. Hiatt. Ills. 2500 w. Ry Age Gaz—Nov. 19, 1915. Commendation.

MISCELLANY

American Railways

Mr. Acworth's Latest Review of the American Situation (71948). W. M. Acworth in the July circular of the National City Bank, N. Y. 1500 w. R A G—July 21, 1916.

Blacksmiths

Convention of the Master Blacksmiths (72674). Ills. 4000 w. R A G—Aug. 25, 1916. Digest of papers and discussions on railway work.

British Railways

The Railways and the Government (73733 A). 2500 w. Enr—Sept. 22, 1916. Critical discussion of existing relations between the State and the railways of England, Wales and Scotland.

Central America

The Railways of Central America (72620 A). Percy F. Martin. Ills. 3500 w. C E M—Aug., 1916. Serial, 1st part. Reviews the service in different states and gives details of traffic.

Co-operation

Building a Line to the Public (72675). Anderson Pace. 1400 w. R A G—Aug. 25, 1916. Abstract of an address before Am. Soc. of R. R. Supts.

Fuel Department

The Fuel Department—A Constructive Criticism (67299). L. G. Plant. Read before the New England R. R. Club. 3000 w. R R—Jan. 15, 1916. Urges an organization that may give a workable standard for American railways.

Government Ownership

Is Government Ownership in Canada a Failure? (73727). J. L. Payne. 3500 w. R A G—Oct. 6, 1916. Critical reply to Mr. Dunn's recent article, giving the true story of the Intercolonial Ry.

Why the Intercolonial Railway Is a Failure (73864). Samuel O. Dunn. 4000 w. R A G—Oct. 13, 1916. Uneconomical government management.

Mail Regulations

New Regulations for Railway Mail Pay (72438). 2500 w. R A G—Aug. 11, 1916. Provisions of interest to railway men.

Military

Importance of Railroads in a Plan of Preparedness (66365). George Dallas Dixon. 3000 w. R A G—Dec. 10, 1915.

The Railroads and National Defense (66465 A). George D. Snyder. Also discussion. 20000 w. N Y R C—Nov. 19, 1915. Necessary preparation for handling troops and supplies.

National Defense

Our Railroads and National Defense (67267). Charles O. Haines. From an article in Sept. *N. Am. Rev.* 1600 w. R A G—Jan. 14, 1916. Urging a Railroad Bureau of National Defense.

Parcel Post

Wanted—A Square Deal (73209). Maurice H. Lundy. 2000 w. R A G—Sept. 15, 1916. Critical discussion of government compensation to the railroads for carrying parcel post.

Preparedness

The Railways and Preparedness (70106 N). J. A. Droege. 27 pp. N E R Club—Apr. 11, 1916. General considerations.

Railways in a System of National Defense (70627). W. L. Park. 4500 w. R A G—May 26, 1916. Requirements.

Radial Railways

Radial Railways (66782). R. O. Wynne-Roberts. 1200 w. Cn E—Dec. 23, 1915. Benefits.

Railroad Characteristics

The Arithmetic of Railroads in New England (72031 N). W. J. Cunningham. with discussion. 35 pp. N E R C—May 9, 1916. Compares the physical, traffic, operating and financial characteristics of the three principal railroads.

R. R. Superintendents

Opportunities for the Railroad Superintendent (72676). C. H. Markham. 1700 w. R A G—Aug. 25, 1916. Abstract of address before Am. Soc. of R. R. Supts. Importance and difficulties of the position.

Railway Economics

The Influence of Modern Engineering on the Future of Railway Economics (67187). Onward Bates. 3000 w. R R—Jan. 8, 1916. Problems to be solved.

Railway Material

The Increase in Prices of Railway Material (73866). 3000 w. R A G—Oct. 13, 1916. 25 to 75 per cent advances.

Railway Problems

Some Suggestions for the Improvement of the Railroad Situation (67492). W. J.

Consult Classification of the Index. See page 7.

Railway Service

Moroney. 3000 w. R A G—Jan. 21, 1916. States some of the problems and gives outline of general suggestions on direction of improvements.

Railway Service

How I Got Customers to See My Side (72441). Edward P. Ripley. 2200 w. R A G—Aug. 11, 1916. Plan carried out on the Santa Fe.

Railway Situation

The Railway Situation from Different Viewpoints (66842). 13800 w. R A G—Dec. 31, 1915. Short articles by Julius Kruttschnitt; Frank Trumbull; Judson C. Clements; Robert R. Prentis; C. H. Markham; W. B. Scott; W. J. Eck; Frank Nay; George Gibbs and W. A. Rogers.

Records

Efficient Railroad Records (68990). F. Lincoln Hutchins. 4000 w. R R—March 18, 1916. Outlines method.

Relations

Report of Committee on Relations Between Railroads (65956). 3000 w. Ry Age Gaz—Nov. 26, 1915. Report to the American Railway Association.

Review of 1915

Railways (67532 A). 3000 w. Enr—Jan. 7, 1916. Reviews briefly events in the United Kingdom, India, Australia, Africa, South America, European continent, etc.

Scrap

How a Great Railroad Handles Its Scrap (72668). E. L. Shaner. Ills. 3500 w. I T R—Aug. 24, 1916. Methods of the Penn. R. R. Co.

MISCELLANY**Testing**

Scrap Reclamation on the Chesapeake & Ohio Ry (72946). H. M. Brown. 1800 w. R R—Sept. 2, 1916. Schemes employed at the Huntington, W. Va., shops.

Standards

Report of Committee on Standards and Recommended Practice (71873 N). Ills. 16 pp. M C B A—May 4, 1916.

Statistics

Comparative Statistics of the World's Railways (65316). 3500 w. Ry Age Gaz—Oct. 29, 1915.

Comparative Railway Statistics (67231 A). 2500 w. R G—Dec. 24, 1915. Serial, 1st part. Information from bulletin of Bureau of Railway Economics concerning the principal countries.

Steam Railroad Statistics to June 30, 1915 (71522). 3500 w. R A G—June 30, 1916. Revenues, expenses, etc.

Storekeepers

The Railway Storekeepers' Association (70468). Ills. 14500 w. R A G—May 19, 1916. Proceedings of convention, reports on scrap, accounting, reclamation, and track materials.

Supply Department

Supply Department Methods on the Seaboard (69097). Ills. 3300 w. R A G—March 24, 1916. Under General Purchasing Agent.

Testing

The Activities of a Railroad Test Department (71914 A). C. D. Young, with discussion. Ills. 28 pp. R C P, Pro—May 26, 1916. Aims of this department of the Penn. R. R. and the facilities. Results recently accomplished.

STREET AND ELECTRIC RAILWAYS

Accident Prevention

Accident Prevention

Safety First in Seattle (67181). George Carson. 3000 w. El R JI—Jan. 8, 1916. Methods which have reduced accidents on street railways.

Articulated Car

The Brooklyn Articulated Car (69392). Ills. 800 w. El R JI—April 8, 1916. Experimental reconstructed car.

Boston Elevated

Boston Elevated Seeks Financial Relief (73638). 7000 El R JI—Sept. 30, 1916. Investigation of need of additional net revenue.

Braking

Emergency Braking of Direct-Current Electric Vehicles (73662). J. A. Clarke Jr. 1500 w. El JI—Oct., 1916. Outlines methods used.

Cable Railway

Conquering the Alps by Cable Railway (72920). 2000 w. R A G—Sept. 1, 1916. Interesting account of their use in war.

Car Bodies

Lengths and Widths for Modern Car Bodies (73643). Ills. 5000 w. El R JI (Con. Sec.)—Sept. 30, 1916. Most economical lengths for city cars.

The Car Body from an Operating Standpoint (73642). Ills. 6000 w. El R JI (Con. Sec.)—Sept. 30, 1916. Characteristics of recent cars.

Car Control

Low-Floor Car Control (73674). Karl A. Simmon. Ills. 600 w. El JI—Oct., 1916. Details of apparatus.

Car Equipment

Doors, Seats and Miscellaneous Interior Equipment (73646). Ills. 5000 w. El R JI (Con. Sec.)—Sept. 30, 1916. Improved features.

Heating, Ventilation and Lighting (73645). Ills. 7000 w. El R JI (Con. Sec.)—Sept. 30, 1916. Recent practice.

Carhouses

Carhouse Design and Construction (67611). C. F. Bedwell. Abstract of paper read before the Am. Elec. Ry. Assn. 1500 w. El R JI—Jan. 29, 1916. Outlines considerations affecting location, architecture and equipment.

Bay State Carhouse at Lowell (67610). Ills. 1500 w. El R JI—Jan. 29, 1916. Main features and detailed costs.

Cars

Car Lighting

Maintenance of Electric Car Lighting Equipment (66026). E. S. M. Macnab. 2200 w. Ry Rev—Nov. 27, 1915. Extract from paper read before the Can. Ry. Club, giving Can. Pacific Ry. practice in inspection and maintenance.

Car Maintenance

Economical Maintenance of City and Interurban Cars (70678). F. J. Bennett. 2500 w. El R JI—May 27, 1916. Depends on frequency of inspection and prompt action. Read before the S.-W. Assn.

Car Materials

Construction Materials and Framing Design (73644). Ills. 5000 w. El R JI (Con. Sec.)—Sept. 30, 1916. Use of steel causing changes in design.

Car Operation

Fundamental Principles of Car Operation Efficiency (67315). C. C. Chappelle. Graphs and curves. 7000 w. El R JI—Jan. 15, 1916. Study of principles involved in use of time-element factors.

Efficiency in Car Operation (72881 A). J. F. Layng. 2500 w. G E R—Sept., 1916. Factors tending to economy.

Cars

Electrical and Mechanical Details of the Bay State Car (66032). Ills. 3500 w. Elec Ry Jour—Nov. 27, 1915.

Neue Decksitz-Motorwagen der Wiener städtischen Strassenbahnen (65476 B). Ludwig Spängler. Ills. 2000 w. E K u B—Oct. 24, 1915. Description of new two-deck car for Vienna.

New Car for Public Service Railway (67314). H. A. Benedict. Ills. 900 w. El R JI—Jan. 15, 1916. Sample car undergoing service tests.

Cleveland Modernizes Fifty Cars (68229). Ills. 2000 w. El R JI—Feb. 19, 1916. Alterations made and shop procedure.

Open Cars Changed to Prepayment (69150). Ills. 1200 w. El R JI—March 25, 1916. Remodeled rolling-stock.

Low-Level Car for Rochester (69836). Ills. 3000 w. El R JI—April 22, 1916.

A New Low-Floor, End Entrance Car (71292). Ills. 1200 w. El R JI—June 24, 1916. Cars for Wilmington & Philadelphia Traction Co.

Consult Classification of the Index. See page 7.

Car Trucks

Stepless Double-Deck Car Introduced in Vienna (70792). Ludwig Spängler. Ills. 700 w. El R JI—June 8, 1916. Unusual seating plan.

Illinois Traction System's One Man Car (74063). Ills. 1500 w. El R JI—Oct. 21, 1916. Novel features of a single-end design.

One-Man, Light-Weight Electric Railway Cars (73659). W. E. Moore. Ills. 2500 w. El JI—Oct., 1916. Their economy, usefulness, construction, operation, etc.

The Development of the Electric Railway Car (73641). Ills. 4000 w. El R JI (Con. Sec.)—Sept. 30, 1916. Tendencies in modern car design.

The Operation of Light-Weight Cars (73594 A). J. C. Thurlwall. Ills. 2500 w. G E R—Oct., 1916. Arrangement in favor of the light-weight one-man car.

Car Trucks

Trucks, Wheels, Axles, and Gearing (73648). Ills. 4500 w. El R JI (Con. Sec.)—Sept. 30, 1916. Latest designs.

Car Ventilation

Some Practical Thoughts on Car Ventilation (69002). George H. Ford. 3000 w. El T—March, 1916. Complexities of problem.

Car Wiring

Some Points on Car Wiring (73673). W. H. Smith. Ills. 1200 w. El JI—Oct., 1916. Suggestions and requirements.

Chicago Traffic

Study of Chicago's Congested Traffic (72086). 5400 w. El R JI—July 29, 1916. Causes of congestion and the remedies.

Chicago's Congested Streets (72318). Ills. 2000 w. El R JI—Aug. 5, 1916. Studies to provide more surface transportation.

Chicago's Congestion Problem (72447). 3000 w. El R JI—Aug. 12, 1916. Causes of delays and remedies.

City Traffic

Passenger Transportation in Large Cities (73898 A). J. M. McElroy. 2500 w. S M C E—Sept. 29, 1916. Discussion of facilities which may be provided.

Cleveland

The Cleveland Street Railway Situation (69890 A). F. W. Doolittle. 50 pp. E C St L, JI—March-April, 1916. Study of costs and conditions.

Competition

The Electric Railway and the Automobile (67182). Ernest Gonzenbach. 2000 w. El R JI—Jan. 8, 1916. Competition serious; remedies.

Contact Systems

Discussion on "Unprotected Top-Contact Rail for 600-Volt Traction System"

MISCELLANY**Electric Traction**

(Jones), "Third Rail and Trolley System of the West Jersey and Seashore Railroad" (Duer), "Contact System of the Southern Pacific Company, Portland Division" (Lebenbaum), "Construction and Maintenance Costs of Overhead Contact Systems" (Amberg and Zogbaum), "Contact System of the Butte, Anaconda and Pacific Railway" (Cox), and "Contact Conductors and Collectors for Electric Railways" (Hixson), Deer Park, Md., July 1, 1915 (66672 D). Ills. 4000 w. A I E E—Dec., 1915.

Note sulla costruzione di linee di contatto per trazione elettrica (66250 B). G. Bianchi Quattrosoldi. Ills. 2000 w. Ind—Dec. 5, 1915. Serial, 1st part. General survey of methods and details in construction of contact lines for electric traction.

Notes on Overhead Construction in Oakland, Cal (67309). Ills. 2000 w. El T—Jan., 1916. Types employed.

Controllers

"Run Back Preventer" Tramcar Controller (70049 A). Ills. 600 w. T & R W—April 13, 1916. Controller with rheostatic braking for forward and backward running.

Current

Current Collection and Utilization (73652). Ills. 2500 w. El R JI (Con. Sec.)—Sept. 30, 1916. New devices.

Current-Leakage

Leakage of Currents from Electric Railways (69161 N). Burton McCollum and K. H. Logan. 30 pp. U S B S, Tech paper 63—March 14, 1916. Results of study.

D. C. Equipment

1200-Volt D.-C. Equipment for the Pacific Electric Railway, San Bernardino Division (72203 A). W. D. Bearce. Ills. 2000 w. G E R—Aug., 1916. Description.

Development

Electric Railways (67234 A). Henry Metcalf Hobart. 2500 w. Mch E—Dec. 24, 1915. Serial, 1st part. "Jame Forrest" lecture. Progress, merits, cost.

Increasing Capacity of Urban Systems (67881). M. C. Brush. Abstract of address to Am. Elec. Ry. Assn. 2200 w. El R JI—Feb. 5, 1916. New construction procedure.

Electric Traction

Electric Traction (73475 A). H. F. Parshall. 2500 w. Eln—Sept. 15, 1916. Historical review.

The Engineering Development of the Electric Railway (73911). Frank J. Sprague. Abstract of paper before Am Elec Ry Assn. 4000 w. El R JI—Oct. 14, 1916. History of electric traction.

Consult Classification of the Index. See page 7.

Electrolysis**Electrolysis**

Effects of Electrolysis on Engineering Structures (65919 A). Albert F. Ganz. Abstract of paper read at Int. Engng. Cong. 5500 w. Electric, Lond.—Nov. 12, 1915. Caused by stray currents from electric railways; means of averting.

Special Studies in Electrolysis Mitigation (68745 N). Burton McCollum and George H. Ahlborn. 60 pp. U S B S, Tech paper No. 54—Feb. 5, 1916. Report on Springfield, O.; insulated feeder system.

Special Studies in Electrolysis Mitigation (68746 N). Burton McCollum and K. H. Logan. Ills. 47 pp. U S B S, Tech paper No. 55—Jan. 22, 1916. Preliminary report on Elyria, O.

Elevated Roads

Ornamental Concrete Elevated Railway, New York City (65684). Maurice E. Griest. Ills. 3900 w. Eng News—Nov. 11, 1915. Vaulted arch construction on Queens Boulevard, N. Y.

Elevated Railway of Domed Arch Construction a Strong Contrast to Steel Structure (72717). Ills. 2000 w. E R—Aug. 26, 1916. Queens Boulevard extension has incased steel girders and reinforced concrete arches supporting ballasted floor.

See also Elevated Railroad under CIVIL ENGINEERING, *Bridges*.

Escalators

See same heading under MECHANICAL ENGINEERING, *Transporting and Conveying*.

Fares

Equipment for Fare Registration and Collection (73647). Ills. 3300 w. El R JI (Con. Sec.)—Sept. 30, 1916. Devices in use.

Franchises

Indeterminate Franchises for Street-Railway Companies (72494). George H. Binkley. 1200 w. W E—Aug., 1916. Franchises in effect in Chicago and in Kansas City are compared with assumed ideal franchise.

Freight Traffic

How One Electric Railway Is Building Up Profitable Freight Traffic (68737). F. E. Wood. Ills. 4000 w. El R JI—March 11, 1916. Satisfactory results in Mine.

Developing Carload Freight Traffic on Illinois Traction System (71673). Ills. 5500 w. El R JI—July 8, 1916. Outlines methods.

An Inexpensive Freight Service (73550 A). J. B. Steuart, Jr. Ills. 1200 w. Ac—Sept., 1916. Economical handling of medium size road.

Lightning Arresters

Utilization of Tramways for Goods Traffic (73836 A). W. G. Holford and W. Clough, with discussion. 4500 w. Eln—Sept. 29, 1916. Gives instances where tramways in England have been so used.

High Tension

Mit hochgespanntem Gleichstrom betriebene Bahnen (66248 B). J. Winkler. Ills. 1500 w. P R—Nov. 24, 1915. Serial, 1st part. Locomotives and motor cars for use with high-tension direct current.

Inspection

Inspection and Maintenance (70357). John Sutherland. 1600 w. El R JI—May 13, 1916. Methods followed at Davenport, Iowa.

Installations

Recent Installations Made by Winnipeg Company (73784). H. A. P. Langstaff. Ills. 1800 w. El W—Oct. 7, 1916. Features of a 5000-amp.-hr. storage battery installation.

Interurban

Seven Years of Operating Experience of a Single-Phase Interurban Railway (65590). Ills. 2500 w. Elec Ry Jour—Nov. 6, 1915. Results on the Chicago, Lake Shore, & South Bend Ry.

Traffic Development on the Scranton & Binghamton Railroad (70498). Ills. 2500 w. El R JI—May 20, 1916.

The Pacific Electric Railway (70847 A). Map & Ills. 3000 w. R G—May 19, 1916. Development of electric railway lines in California.

Electric Locomotives for Interurban Service (72200 A). S. T. Dodd. Ills. 3500 w. G E R—Aug., 1916. Analyzes the conditions which limit the capacity in each of these services, developing formula. Describes types.

The Present and Future Development of Interurban Railways (72939). F. W. Doolittle. 4000 w. El R JI—Sept. 2, 1916. Analyzes causes of failure and conditions promising better results.

Interurban Terminal

Dallas Railway Completes Seven-Track Interurban Terminal (73437). Ills. 1500 w. El R JI—Sept. 23, 1916. Detailed description.

Iowa

Improvements on Iowa Electric Railway (68198). Ills. 2500 w. El T—Feb., 1916. On Waterloo, Cedar Falls & Northern.

Jitneys

Current Tendencies in the Railway Business (71552). Thomas Conway, Jr. 2200 w. El R JI—July 1, 1916. Jitneys.

Lightning Arresters

Installation and Maintenance of Car Lightning Arresters (73242). Ills. 1200

Load Dispatching

w. El R JI—Sept. 16, 1916. Types and their location.

Load Dispatching

Load Dispatching at East St. Louis (67513). Harold W. Clapp. Ills. 2500 w. El R JI—Jan. 22, 1916. Method of centralizing control of power distribution.

London

London Traffic in 1913 (68451 A). Albert Stanley. 14500 w. T & R W—Feb. 10, 1916. Read at Int. Eng. Cong., San Francisco. General review of urban railways, tramways and omnibuses.

London County Council Tramway Accounts (69312 A). 2500 w. Eln—March 17, 1916. Analyses and extracts.

Los Angeles

Big Problems of Transportation (67310). Paul Shoup. 1800 w. El T—Jan., 1916. Electric and interurban railways in Los Angeles and vicinity.

Lubrication

Progress in Car Equipment Lubrication (69967). Alfred Green. Ills. Abstract of paper before Conn. Sec. of Am. Elec. Ry. Assn. 2500 w. El R JI—April 29, 1916. High maintenance and high lubrication costs go hand-in-hand.

Maintenance

Graphics in Maintenance Work (65591). Ills. 1500 w. Elec Ry Jour—Nov. 6, 1915. Examples of graphical records in electric railway practice.

Reducing Maintenance Costs on a Single-Phase Railway (66158). Ills. 3500 w. El R JI—Dec. 4, 1915. Details of economies developed.

Maintenance of Railway Equipment (73672). A. B. Cole. Ills. 7000 w. El JI—Oct., 1916. Methods in use at Cleveland repair shops.

Maintenance Trucks

Overhead Line Maintenance Trucks of the Third Avenue System (71853). James D. Kent. Ills. 3500 w. El R JI—July 15, 1916. Types of motor trucks.

Motors

Luftgekühlte Strassenbahnmotoren. (66257 B). Leonhard Adler. Ills. 3000 w. E u M—Dec. 5, 1915. A E G design for air-cooled tramway motors.

Control Systems and Wiring for Railway Motors (73651). Ills. 4500 w. El R JI (Con. Sec.)—Sept. 30, 1916. Recent innovations.

Modern Railway Motor Design and Methods of Construction (73650). Ills. 4500 w. El R JI (Con. Sec.)—Sept. 30, 1916. Use of interpoles and ventilation and resulting changes.

New Motors for Old (73671). J. B. Ervin. Ills. 2200 w. El JI—Oct., 1916.

Paris

Some considerations on the retiring of obsolete railway motors.

Newark Traffic

Rerouting a Traffic of Nine Cars a Minute (72085). H. C. Donecker. Ills. 3300 w. El R JI—July 29, 1916. How Newark solved the problem of handling exceptionally dense traffic under trying conditions.

New South Wales

Electric Tramway. The Spit to Manly, N. S. W. (69796 N). John Job Crew Bradfield. Ills. 2500 w. I C E, No. 3972—1915. Detailed description.

New York

Development of New York's Rapid Transit System Resulting in Dual Contracts (65569). Map. 2500 w. Eng Rec—Nov. 6, 1915. Advances made in facilities for handling heavy traffic.

Rapid Transit Work in 1915, New York City (70058). D. A. Sealey. Ills. 6000 w. E N—May 4, 1916.

General Tie-Up Threatened in New York (72320). 7500 w. El R JI—Aug. 5, 1916. Explanation of the situation.

N. Y. Dual System

Standardized Car Equipments for New York Dual System of Rapid Transit (73664). Lynn G. Riley. Ills. 2200 w. El JI—Oct., 1916. Characteristics of new cars; control apparatus.

N. Y. Subways

The Construction of the New Subways for New York City (73847 A). Robert H. Jacobs. Maps. 30 pp. N Y R C Pro—Sept. 15, 1916. Account of this work.

One-Man Cars

One-Man Cars Becoming Popular (66872). Ills. 4000 w. El R JI—Jan. 1, 1916. Favorable reports.

New Type of One-Man Car (68997). Ills. 1600 w. El R JI—March 18, 1916. Characteristics.

Ontario

The Lake Erie & Northern Railway (70677). Ills. 1800 w. El R JI—May 27, 1916. New 1500-volt line in Ontario.

Overhead Construction

Overhead Construction—Tools, Specifications and Tests (68994). Charles R. Harte. Ills. 4000 w. El R JI—March 18, 1916. Town cars and automobile emergency wagons.

L'équipement des lignes aériennes triphasées des chemins de fer électriques italiens (71324 B). Carlo M. Lericci. Ills. 5500 w. Gn Cv—May 13, 1916. Three-phase overhead line equipment on Italian electric railways.

Paris

Paris Inter-Urban Traffic and the War (65782 A). 2000 w. Engng—Nov. 5,

Consult Classification of the Index. See page 7.

Parlor Cars

1915. Report of changed conditions due to war influence.

Recents travaux du Métropolitain (70189 B). Lucien Fournier. Ills. 2500 w. La Nt—May 13, 1916. Recent work in subway transportation in Paris.

Paris Municipal Tramways Electrification (70745 A). Ills. 6500 w. T & R W—May 11, 1916. Serial, 1st part. Progress of work begun in 1911.

Nouveau système de traction électrique en service aux Chemins de fer Métropolitains de Paris (72117). Leon Ots—Chevalier. Ills. 3200 w. Ing—July 7, 1916. New system of electric traction in service on the Metropolitan railway of Paris.

Parlor Cars

Parlor Cars to Stimulate Traffic (68442). Ills. 1500 w. El R JI—Feb. 26, 1916. Between Rochester and Syracuse, N. Y.

Portland, Ore.

Generating and Distributing System of Portland Railway, Light and Power Company (65732). R. R. Robley. Ills. 3000 w. Elec Trac—Nov., 1915. Descriptive.

Power

Power Generation for Railways (71239 A). H. G. Stott. 3000 w. Ae—June, 1916. Central plant vs. smaller units; power bought or made.

Power Distribution

Economics of Electric Railway Distribution (69809 N). Horace Field Parrshall, with discussion. Plates. 70 pp. I C E, No. 4119—Nov. 17, 1914. The capacity and spacing of sub-stations for best results.

Power Economies

Car-Operating Efficiency (69391). J. F. Layng. Abstract of paper read before Ill. Elec. Ry. Assn. 2000 w. El R JI—April 8, 1916. Effect of coasting, stops per mile, etc.

Saving Power with Watt-Hour Meters (69966). F. V. Skelley. Ills. 1200 w. El R JI—April 29, 1916. Methods employed at Davenport, Iowa.

Power Load

Building Up a Big Power Load on an Electric Railway (72721). Ills. 1800 w. El R JI—Aug. 26, 1916. Methods on the "Fort Dodge Line."

Power Plants

A Railway Power Plant Rebuilt Without Interfering with Operation (65363). Ills. 2500 w. Elec Ry Jour—Oct. 30, 1915. At Springfield, O.

Power Sales

Selling Energy Along Interurban Railways (74187). Ills. 5000 w. El R JI—Oct. 28, 1916. Furnishing power for lighting and industrial uses.

Rates**Power Saving**

The Fundamentals of Power Saving (72940). William Arthur. 3500 w. El R JI—Sept. 2, 1916. Rules relating to methods of power saving.

Power System

Power System of Twin City Lines (72872). E. H. Schofield. Ills. 1500 w. N E—Sept., 1916. Steam and water plants of nearly equal capacity; character of equipment and operating costs.

Problems

Some Problems of the Electric Railway Industry (70793). F. W. Doolittle. Abstract of paper before New England St. Ry. Club. 5500 w. El R. JI—June 3, 1916. Effect of slight increase or decrease in fares.

Public Relations

The Public and Electric Railways (69197 A). O. B. Willcox. Read before Am. Elec. Ry. Assn. 3500 w. G E R—April, 1916. Requirements to interest capital.

Rail Bonding

Gas-Weld Rail Bonding (66034). J. Rowland Brown. Read before the Ill. Elec. Assn. Ills. 2000 w. Elec Ry Jour—Nov. 27, 1915. Welding equipment and advantages of the process.

Rail Bond Testing—I—Methods Used in Testing (66160). H. H. Febrey. Ills. 1500 w. El R JI—Dec. 4, 1915. Serial, 1st part. Details of testers.

Rail Joints

Modern Practice in the Construction and Maintenance of Rail Joints and Bonds in Electric Railways (69160 N). E. R. Shepard. Ills. 120 pp. U S B S, Tech paper 62—March 10 1916. Results of investigation.

Railless

Trolley Omnibuses versus Motor Omnibuses (66772 A). Harry Webber. Ills. 3000 w. T & R W—Dec. 9, 1915. Compares results obtained.

Rails

Curved Heads for Girder Rails in Brooklyn (66756). R. C. Cram. Ills. 3500 w. El R JI—Dec. 25, 1915. Advantages, especially the reduction of corrugation; details.

Rail Joints (70356). R. H. Findley. 3000 w. El R JI—May 13, 1916. Read before Iowa Assn. Types.

Rates

Allgemeine technische und wirtschaftliche Gesichtspunkte für die Bildung von Strassenbahntarifen (67775 B). Von Bussebaum. 4000 w. E K u B—Jan. 24, 1916. Important factors to be considered in constructing a street railway tariff.

Receipts**Receipts**

Rehabilitating Railway Receipts
(73774). Ills. 2000 w. El R JI—Oct. 7, 1916. Methods of Binghamton (N. Y.) railway.

Remodeling

Vestibuling 560 Semi-Convertible Cars
(72566). Ills. 2000 w. El R JI—Aug. 19, 1916. Remodeling vestibules of Baltimore cars.

Resistors

Grid Resistor Standardization (73669). H. H. Johnston. 2000 w. El JI—Oct., 1916. Scheme for making up a standardization.

The Design of Direct Current Railway Accelerating Resistors (73675). L. J. Hibbard. 1500 w. El JI—Oct., 1916. Problems involved.

Return Feeders

The Return Feeder System of the Interborough (67514). I. W. Gross. Ills. 1200 w. El R JI—Jan. 22, 1916. Negative layout on subway lines; benefits from insulated feeder system.

Review of 1915

Chief Features of 1915 Electric Railway Statistics (66870). 10000 w. El R JI—Jan. 1, 1916. Summary of electric railway progress.

Rolling Stock

Notes on the Maintenance of Rolling Stock on the London Underground Railways (69437 A). Ills. 2000 w. El R—March 24, 1916. Observations on visit to repair shops.

Safeguards

Boston Elevated Reports on Safety (69247). Ills. 1500 w. El R JI—April 1, 1916. Suggested precautions.

Safety Devices

Brakes, Couplers and Other Safety Devices (73649). Ills. 4500 w. El R JI (Con. Sec.)—Sept. 30, 1916. Recent developments.

A New Contactor Signal Using Standard High-Speed Aspects (73640). Ills. 2500 w. El R JI—Sept. 30, 1916. Recently developed "Type N" signal.

Schedules

Schedule Making and Cutting Up (72642 A). M. J. Feron. 2500 w. Ae—Aug., 1916. Methods in use on the Chicago Elevated Ry.

Shop Practice

Special Equipment of New Cleveland Shops (69001). Ills. 1800 w. El T—March, 1916. Special devices.

See also **Street-Railway Shops under INDUSTRIAL MANAGEMENT, Management.**

Shops

Cleveland Railway Occupies New Repair Shops (65882). Ills. 3500 w. Elec Ry Jour—Nov. 20, 1915. Outline of op-

eration and description of special equipment.

Signaling

Signaling a Large Interurban Railway (66300). Ills. 3000 w. Sg E—Dec., 1915. Automatic blocks and interlocking plants.

Subway Protection on an Electric Line (67907). Ills. 1200 w. R S E—Feb., 1916. On Winnipeg electric railway.

A. C. Signaling in the Centre St. Loop (68602). Walter F. Hudson. Ills. 4000 w. R S E—March, 1916. Automatic system in N. Y.

A. C. Signaling in the Centre St. Loop (69432). Walter F. Hudson. Ills. 2500 w. R S E—April, 1916. Interlocking plants in this N. Y. subway.

Signaling in the Public Service Terminal (70355). J. W. Brown. Ills. 2000 w. El R JI—May 13, 1916. Interlocking system. Instructions.

A. C. Signaling on the Oakland Terminal (73793). L. E. Jones. Ills. 4000 w. R S E—Oct., 1916. Automatic stops added to usual equipment.

Signals

Signals on the Scranton & Binghamton Railway System (72938). Ills. 2500 w. El R JI—Sept. 2, 1916. High degree of reliability.

Skip Stops

Eliminated Stops in City Service (66871). 5600 w. El R JI—Jan. 1, 1916. Schedule discussed by operators.

Snow

Fighting the Storm King in Montreal (65731). A. Gaboury. Ills. 3000 w. Elec Trac—Nov., 1915. Methods and equipment for snow removal.

Snow-Fighting Apparatus (67515). H. Bates. 2000 w. El R JI—Jan. 22, 1916. Methods of disposing of snow.

Public Service Railway Company Snow Sweeper (67308). H. A. Benedict. Ills. 1200 w. El T—Jan., 1916. Details of design.

Stations

Boston Profits by Elevated Railway Station Improvements (72445). Ills. 2500 w. El R JI—Aug. 12, 1916. Reconstruction of stations, arrangement of loop tracks and other improvements recently completed.

Steel Cars

Steel Cars for Cache Valley Route (67307). Ills. 1000 w. El T—Jan., 1916. Motor cars and trailers for high-speed interurban service.

Stops

Factors Affecting Duration of Stop (69837). D. D. Ewing. 2500 w. El R JI—April 22, 1916.

Consult Classification of the Index. See page 7.

Storage Battery Cars**Storage Battery Cars**

Operation, Maintenance and Performance of Storage Battery Cars on the Long Island Railroad (73661). R. W. Brodmann. 2000 w. El JI—Oct., 1916. Details of equipment and performance.

Substations

Automatically Controlled Substations with Particular Reference to Their Application to Interurban Electric Railways. (67685 D.) 1500 w. A I E E, Pro—Feb., 1916. Discussion of paper of E. W. Allen and Edward Taylor at San Francisco, Cal., Sept. 16, 1915.

A Recent Railway Substation (70972). G. C. Hecker. Ills. 1200 w. El R JI—June 10, 1916. Serial, 1st part. General features.

Subways

The East 55th Street Subway Ordinance (66015 A). Bernard L. Green. Also discussion. 3000 w. Cleveland Engng Soc, Jour—Nov., 1915. Proposed subway in Cleveland, O., from L. Erie to points in the upper Cuyahoga Valley, and to provide extensive railway yards.

I. The Harlem River Four-Track Subway Tunnel. Olaf Hoff. II. Detail and Fabrication of Harlem River Tubes. Thomas Duckforth (65748 B). Ills. Discussions of both papers. 67 pp. Engrs' Soc of W Penn, Pro—Oct., 1915. Sections of the Lexington ave subway, N. Y. City.

Progress on the Boston Subway (68989). Ills. 4000 w. R R—March 18, 1916. From report of Edmund S. Davis.

Subway Excavations—Yesterday and To-day (69132). Charles A. Hirschberg. Ills. 1000 w. M & E W—March 25, 1916. Methods in New York.

Tube Tunnelling (71205 B). R. W. Thomas. Ills. 2500 w. P-W I, JI—April, 1916. General survey; sinking shafts; driving tubes.

Construction of Eastern Parkway Subway, Brooklyn (72391). Ills. 1800 w. Cnt—Aug., 1916. Mechanical excavation of open cut.

The William-Street Section of the New York Subway (72692 A). Ills. 4000 w. Enr—Aug. 11, 1916. Explains the conditions and methods of overcoming difficulties, such as shoring of buildings, non-interference with traffic, etc.

Subway Ventilation

Subway Air Exceeds Health Board's Standards, Ventilating Experts Find (68982). 2500 w. E R—March 18, 1916. Committee investigation.

Supply Manufacture

Shop Manufacture of Supplies (69674 A). William R. Tait. Ills. 11 pp. A E

Tracks

—April, 1916. Experience of Brooklyn Rapid Transit.

Switches

600-1200 and 750-1500 Volt Direct-Current Change-Over Switches (73668). H. R. Meyer. Ills. 1800 w. El JI—Oct., 1916. Details of change-over switches used on high-speed interurban cars.

Terminals

Cleveland Completes Two More Terminals (71991). Ills. 1500 w. El R JI—July 22, 1916. New operating stations. Interesting installations.

Three-Wire System

Three-Wire System in Los Angeles (68443). S. H. Anderson. Ills. 1200 w. El R JI—Feb. 26, 1916. Advantages and disadvantages.

Track Foundation

Track Foundation in Auckland, New Zealand (72285 A). Harold Bond. Ills. 1600 w. T & R W—July 13, 1916. Some local conditions, the problems and construction.

Concrete Track Foundation (72643 A). 3000 w. Ae—Aug., 1916. Practicability of this type of construction. Results in service.

Track Maintenance

The Influence of the Street, as a Location, Upon Street Railway Track Maintenance (72639 N). R. C. Cram. 5000 w. Conn Soc Civ Engrs—1916.

Track Paving

The Paving of Street Railway Track Areas (73060). L. McLaren Hunter. Ills. 800 w. Cn E—Sept. 7, 1916. Developments in Ottawa.

Tracks

Estimating Cost of Track Construction on a Unit-Time Basis (67183). Carl H. Fuller. 3300 w. El R JI—Jan. 8, 1916. Method particularly for labor.

Track Construction (68200). H. S. Cooper. 3500 w. El T—Feb., 1916. Serial, 1st part. In cities and towns.

Concrete in Interurban Track Construction (68844 N). W. Stoutnour. Ills. 13 pp. U S E JI—Feb., 1916. Practice on Salt Lake & Ogden.

Street Railway Track Construction in Paved Streets (68920). R. Keith Compton. 2500 w. G R—March 4, 1916. Old and new systems.

Unit Track Construction Costs for Thirty-one Jobs (68998). Ills. 3000 w. El R JI—March 18, 1916. Cost distribution by Cleveland Ry.

Unballasted Track Gives 50 Per Cent Lower Maintenance Cost (73241). William S. Twining. Ills. 1200 w. El R JI—Sept. 16, 1916. Interesting comments on track construction in the Philadelphia subway.

Traffic

Methods of Handling Track Work in Kansas City (73065). Ills. 4000 w. El R Jl—Sept. 9, 1916. Construction and maintenance methods adapted to this particular case.

Observations of a Traveling Track Specialist (73775). A. Swartz. 2000. El R Jl—Oct. 7, 1916. Results of recent inspection trip.

Traffic

Determining the Actual Length of Ride (69151). D. J. McGrath. 2500 w. El R Jl—March 25 1916. Traffic-court method.

Developing Interurban Traffic (70679). James P. Griffin. 3000 w. El R Jl—May 27, 1916. Read before the S.-W. Assn. Suggestions for increasing business.

Utah**Train Control**

Toledo Adopts Train Control (73660). C. A. Brown. Ills. 1800 w. El Jl—Oct., 1916. Account of trials, and reasons for.

Unit-Switch Control on the New York Municipal Railway (73663). E. Keller. Ills. 900 w. El Jl—Oct., 1916. Details of type selected for the new subway cars.

Trolley Wire

Why Trolley Wire Wears Out (68999). S. L. Foster. 2000 w. El R Jl—March 18, 1916. Causes.

Utah

An Important Interurban Railway System in Utah (66393). Ills. 1200 w. R R—Dec. 11, 1915. The Ogden, Logan & Idaho Ry.

THE ENGINEERING INDEX

Volume I., 1884 to 1891 inclusive,	Out of Print
475 pages. Edited and published by The Association of Engineering Societies under the direction of Prof. J. B. Johnson.	
Volume II., 1892 to 1895 inclusive,	Out of Print
474 pages. Edited by The Association of Engineering Societies under the direction of Prof. J. B. Johnson, and published by THE ENGINEERING MAGAZINE.	
Volume III., 1896 to 1900 inclusive,	\$7.50
1,030 pages. Edited and published by THE ENGINEERING MAGAZINE.	
Volume IV., 1901 to 1905 inclusive,	\$7.50
1,234 pages. Edited and published by THE ENGINEERING MAGAZINE.	
THE ENGINEERING INDEX ANNUAL FOR 1906,	\$2.00
412 pages. Edited and published by THE ENGINEERING MAGAZINE.	
THE ENGINEERING INDEX ANNUAL FOR 1907,	\$2.00
450 pages. Edited and published by THE ENGINEERING MAGAZINE.	
THE ENGINEERING INDEX ANNUAL FOR 1908,	\$2.00
460 pages. Edited and published by THE ENGINEERING MAGAZINE.	
THE ENGINEERING INDEX ANNUAL FOR 1909,	Out of Print
490 pages. Edited and published by THE ENGINEERING MAGAZINE.	
THE ENGINEERING INDEX ANNUAL FOR 1910,	\$2.00
528 pages. Edited and published by THE ENGINEERING MAGAZINE.	
THE ENGINEERING INDEX ANNUAL FOR 1911,	\$2.00
530 pages. Edited and published by THE ENGINEERING MAGAZINE.	
THE ENGINEERING INDEX ANNUAL FOR 1912,	\$2.00
520 pages. Edited and published by THE ENGINEERING MAGAZINE.	
THE ENGINEERING INDEX ANNUAL FOR 1913,	\$2.00
510 Pages. Edited and published by THE ENGINEERING MAGAZINE CO.	
THE ENGINEERING INDEX ANNUAL FOR 1914,	\$3.00
542 pages. Edited and published by THE ENGINEERING MAGAZINE CO.	
THE ENGINEERING INDEX ANNUAL FOR 1915,	\$3.00
420 pages. Edited and published by THE ENGINEERING MAGAZINE CO.	
THE ENGINEERING INDEX ANNUAL FOR 1916,	\$3.00
368 pages. Edited and published by THE ENGINEERING MAGAZINE CO.	

The monthly continuation of the Index, from the close of 1916, is to be found in the successive issues of Industrial Management.

THE ENGINEERING MAGAZINE CO.
140-142 NASSAU STREET, NEW YORK

This book should be returned to
the Library on or before the last date
stamped below.

A fine of five cents a day is incurred
by retaining it beyond the specified
time.

Please return promptly.



